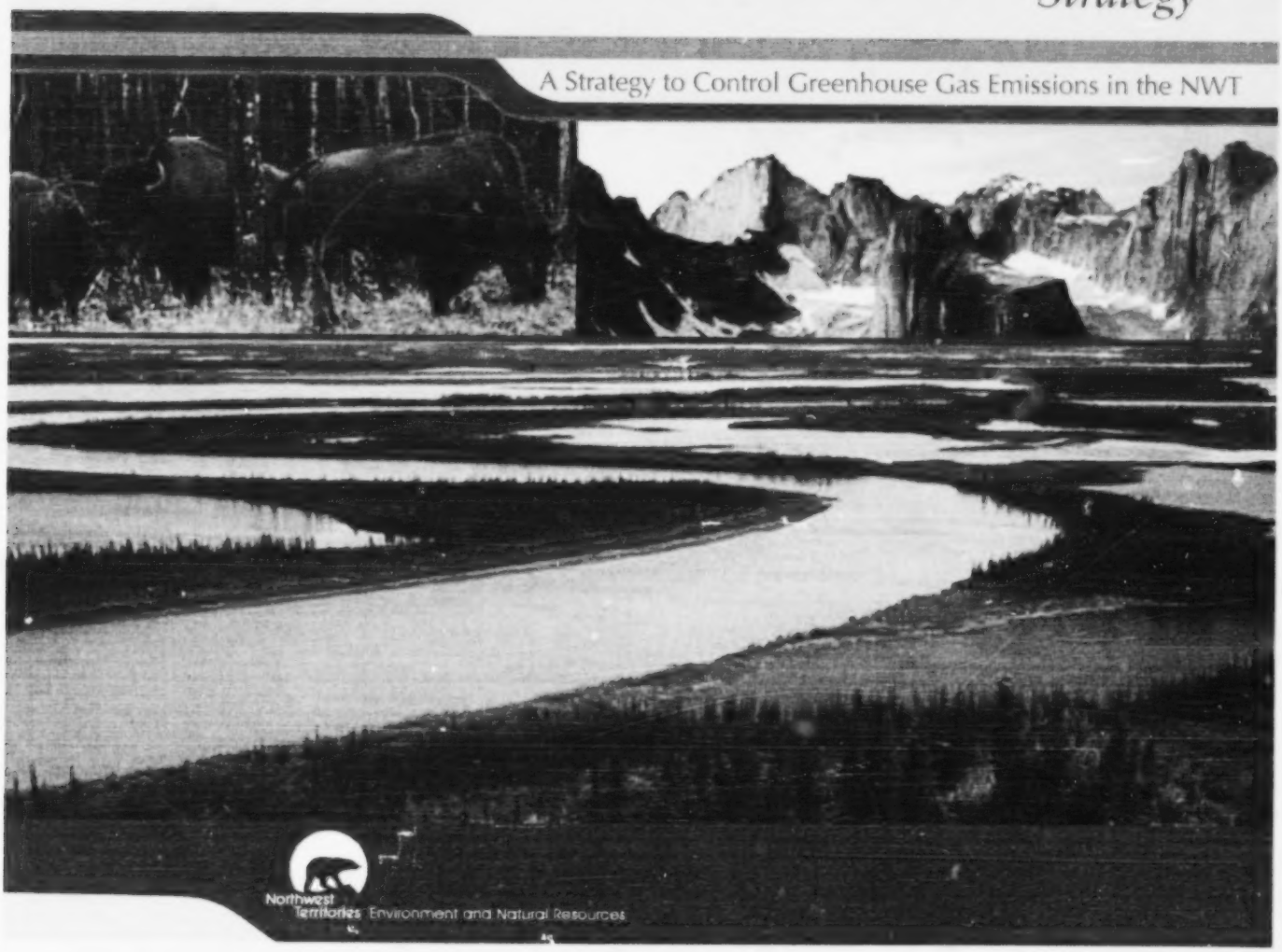
2007-2011

NWT Greenhouse Gas *Strategy*

A Strategy to Control Greenhouse Gas Emissions in the NWT



Northwest Territories Environment and Natural Resources

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Minister's Message

Global climate change is one of the most serious environmental, economic and political challenges of our time. There is consensus among climate scientists that the Earth's climate is changing because of human use of fossil fuels.

In 1998, the Government of the Northwest Territories (GNWT) committed to working with federal and provincial governments to develop an equitable approach to Canada's international commitment to reduce national emissions to 6% below 1990 levels by the year 2012. The first step towards this commitment was the release of the NWT Greenhouse Gas Strategy in 2001. A broad range of stakeholders worked with the GNWT to prepare a northern approach to control greenhouse gas emissions.

This revised Strategy builds on the knowledge and experience gained since 2001. It commits the GNWT to lead through example by adopting a target to reduce greenhouse gas emissions from its own operations to 10% below 2001 levels by the year 2011. It includes actions to encourage and assist other sectors to develop their own emission management plans and targets, and commits the GNWT to establish longer-term targets beyond 2011 by undertaking another review in 2010.

We are all aware that climate change impacts are being felt earlier in the North than in the rest of the world. Other Canadians and countries will be looking to the Northwest Territories to see how we control our own greenhouse gas emissions and begin to adapt to the impacts of climate change. By working together with our stakeholders and the federal government we will be able to meet this challenge in the Northwest Territories.

Michael McLeod

Minister
Environment and Natural Resources

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Introduction
1.0

Regions all around the world are experiencing changes in their climates. To avoid future costs of climate change impacts, 189 countries have ratified the 1992 United Nations Framework Convention on Climate Change that launched controls on global releases of greenhouse gases. The 1997 Kyoto Protocol represents initial steps under the Framework Convention to introducing national emission reduction targets, starting with developed nations and has been ratified by 168 countries.

The Government of the Northwest Territories (GNWT) adopted a position on climate change in 1998 (see Appendix 1). This position states that the government is committed to working with federal, provincial and territorial governments to develop an equitable approach to Canada's international commitment to reduce national emissions to six % below 1990 levels by the year 2012.

The NWT Greenhouse Gas Strategy was first released in 2001. It was prepared by a broad range of stakeholders who worked with the GNWT to identify a northern approach to mitigate or control greenhouse gas emissions in the NWT.

At the time of its release in 2001, it was recognized that the Strategy would need to be revised in future years. After a 2005 review, there was a clear consensus among partners that the Strategy should be updated to reflect new knowledge and priorities.

This revised Strategy reflects experience gained over the years since the first version was released. It describes actions being taken to control greenhouse gas emissions from the NWT. Many actions from the original NWT Greenhouse Gas Strategy continue, some actions are enhanced and others are new.

Short-term targets set until 2011 have been introduced, along with better mechanisms to track and measure progress. Setting longer-term targets beyond 2011 should be reviewed in 2010, as progress is made on this Strategy and in response to federal and international decisions.

Climate change impacts and adaptations are becoming more apparent in the NWT. The GNWT recognizes the need for an impacts and adaptation plan. The Department of Environment and Natural Resources will initiate stakeholder consultations starting in 2007, to develop a separate companion plan for those aspects of the climate change problem.

Arctic average temperature has risen at almost twice the rate as the rest of the world in the past few decades. (Arctic Council Impact Assessment, 2005)

1.1 Global Climate Change and Impacts in the NWT

Naturally occurring gases in the Earth's atmosphere, such as carbon dioxide (CO_2) and methane (CH_4) help to stabilize and warm our planet. These gases are known as greenhouse gases because they act like a layer of glass in a typical greenhouse, letting sunlight through and trapping heat in. Human activity, especially burning fossil fuels, produces large amounts of greenhouse gases. Increasing the levels of these gases in the Earth's atmosphere means that more heat is trapped, resulting in changes to climate around the world.

Global climate change is considered one of the most serious environmental, economic and political challenges of our time. There is consensus among climate scientists that the Earth's climate is changing due to human activity. Global use of fossil fuels continues to increase, causing levels of greenhouse gases in the atmosphere to rise. Scientists project that climate change impacts will accelerate during this century due to greenhouse gases that have already been released into the earth's atmosphere.

Environmental Impacts of Climate Change in the North:

- **Warmer winter temperatures**
- **Less predictable ice conditions and shorter winter road seasons**
- **Invasive species (deer, magpies, cougars)**
- **More insect pests**
- **Thawing of permafrost**
- **Higher sea levels**
- **Increased forest fires and insect infestations**
- **Melting sea ice**
- **Likely negative effects on animal species (caribou, bears, seals)**
- **Less predictable weather patterns**
- **Shifting vegetation zones (more shrubs in the tundra)**

In 2005, the Arctic Council released the Arctic Climate Impact Assessment (ACIA). This report concluded that annual average temperatures in the circumpolar Arctic have increased approximately 2 to 3 °C since the 1950s and by up to 4 °C in winter – almost twice the rate of the rest of the world. Over the next 100 years, annual average temperatures in the Arctic are projected to rise a further 3 to 5 °C, with winter temperatures increasing by 4 to 7 °C.

Impacts in the NWT from climate change are beginning to be seen in a number of sectors. For example, oil and gas, mining, transportation and construction sectors all must address increasing problems associated with a melting permafrost layer. Design criteria and engineering standards need to be revised for new construction to adapt to permafrost degradation in a warming climate. Shorter and less dependable winter road seasons have increased costs and reduced the reliability of getting goods and materials into remote locations where there is no other form of surface transportation.

Sea ice on the NWT's Arctic coast is getting thinner and less extensive, disrupting both wildlife and human ecologies. Recent scientific data confirm local observations that the range and availability of species, including polar bear, walrus, seal and caribou, are beginning to change, posing challenges to human health and food security. Dene First Nation elders are reporting that moose, whitetail deer, coyotes, beavers and bird species are extending their ranges northward. Musk oxen are moving south. Changes in the NWT climate are also affecting forest fire cycles, water levels in rivers and lakes, shoreline erosion and the proliferation of insect species, including flies and mosquitoes, that bother humans and cause stress for animals and forests.

1.2 NWT Emission Challenges

In total, the NWT accounts for a very small portion (less than 0.3%) of Canada's total annual greenhouse gas emissions. While this is not much in relative terms, on a per-capita basis the total releases from all activities in the NWT equal over 40 tonnes of emissions (CO_2) per person per year. This is significantly higher than the national average of 22 tonnes per person per year.

The NWT is a vast wilderness that is characterized by long distances between communities and long cold, dark winters. These characteristics and the energy-intensive resource industries in the NWT have caused the emissions per person to be higher than the national average. New energy efficient technologies are becoming available that provide better use of clean NWT energy sources, but these energy systems must be robust and reliable under northern conditions in order to be considered economical to use.

The biggest challenge involves striking the right balance between meeting the energy needs of economic development and the need to protect and preserve the environment. Energy and mineral resource developments are anticipated to play a critical role in the NWT economy for decades to come, thus providing the economic base and revenues which the GNWT and emerging Aboriginal governments will need to deliver services to NWT residents.

Resource revenue sharing and devolution of decision-making powers for the management of lands, water and natural resources continue to be negotiated between federal, territorial and Aboriginal governments in the NWT. Until these powers are devolved to the GNWT and Aboriginal governments, the Government of Canada will continue to play an important role in resource management and environmental protection in the NWT.

In 2001, NWT greenhouse gas emissions were estimated to be 1,750 kilotonnes of carbon dioxide equivalents (CO_{2e}), up from 1,090 in 1996. Although this is a small percentage of Canada's total of 758,000 kilotonnes, NWT emissions grew at a much quicker rate than the national average because of an increase in industrial activity over that period. Current estimates suggest that growth in emissions stabilized by 2005. This will be confirmed in an inventory being prepared for 2006.

1.3 Energy, Emissions and the Economy

Industrial growth in the NWT is increasing the amount of fossil fuels burned. This presents a very challenging situation, as the ongoing development of the NWT economy, particularly mineral and energy resources, will result in much higher annual emissions. For example, if the current proposed oil, gas and mining developments proceed, the NWT will double, and could triple, its emissions.

Given the direct correlation between economic growth and the increase in the NWT's greenhouse gas emissions, it is recognized that the goals and actions in the NWT Greenhouse Gas Strategy need to be generally consistent with broader energy and economic strategies and plans.

In areas of overlap, such as energy efficiency measures, renewable energy technologies and community energy planning, the implementation of actions under the NWT Greenhouse Gas Strategy should be coordinated with NWT economic development objectives to ensure consistency and cost-effectiveness.

Controlling greenhouse gas emissions offers other environmental, health, economic and social benefits. Many actions to control greenhouse gases also cut emissions of air pollutants that affect local air quality and public health. Energy efficiency can help consumers manage energy costs in the face of rising fuel prices. Development of renewable energy provides opportunities for technological advancement, job creation and business opportunities to supply equipment and services for new technologies.

1.4 2001 Strategy

In 1998, the GNWT adopted an official position on climate change that recognized the NWT's responsibility to contribute to Canada's efforts to reduce greenhouse gas emissions. In 1999, the GNWT initiated the development of the NWT Greenhouse Gas Strategy with the participation of a broad range of stakeholders.

Released in 2001, the focus of the NWT Greenhouse Gas Strategy was to:

- identify and coordinate northern actions to begin to control greenhouse gas emissions; and
- assist in developing and contributing a northern perspective as part of Canada's national climate change implementation strategy.

At the time of its release, the 2001 Strategy was considered a "living document". Initially, 20 measures were organized under five themes. It was recognized that the Strategy would likely be revised in the future, as more information became available.

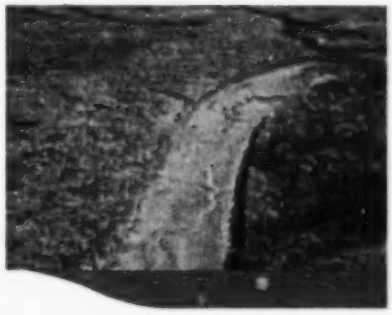
In 2005, the Department of Environment and Natural Resources undertook a review of the progress made since 2001. An invitational, stakeholder-focused approach was used to conduct this review, including solicitation of written submissions, stakeholder interviews and a facilitated, one-day meeting in March 2005.

Key findings and recommendations from the review included:

- A general consensus among review participants that the Goals, Objectives and Principles in the original strategy are mostly "right" and do not require substantial revision;
- A general consensus that the themes in the Strategy are appropriate and that the 34 greenhouse gas emission or climate change-related initiatives undertaken in the NWT since 2001 (by a wide range of organizations) represent a "good start" towards managing NWT greenhouse gas emissions;

- Participants' concerns about shortcomings in the existing Strategy included a lack of specific emission targets, the absence of an implementation plan, insufficient funding and a general lack of accountability for results;
- A strong consensus that more needs to be done to address climate change impacts in the NWT. Most participants supported the idea of developing a separate companion strategy (or plan) to co-ordinate and support impacts and adaptation activities and did not believe that emission mitigation should be combined with impact and adaptation activities in a single climate change strategy or action plan;
- A general consensus that some type of climate change mechanism, such as a Secretariat, should be established to support and improve communication and co-ordination among the many groups and organizations actively involved in, or interested in, emission mitigation and/or impact and adaptation work in the NWT; and
- A clear consensus that the NWT Greenhouse Gas Strategy should be renewed for the future.

1.5 Strategy Renewal



The 2005 review found that new actions, not described in the original Strategy, had been initiated. New actions were often undertaken because they made economic sense as well as provided emission reductions.

This document represents a renewal of the NWT Greenhouse Gas Strategy. It contains:

- the same Goals, Objectives and Principles from the 2001 version;
- an update of ongoing actions and new measures that will be initiated;
- better ways to track, report and coordinate actions taken to control greenhouse gas emissions from the NWT, and;
- new short and long-term targets for the NWT.

Climate change impacts and adaptation are not addressed in this Strategy. Environment and Natural Resources will initiate stakeholder discussions about an impact and adaptation plan after the Greenhouse Gas Strategy is implemented.

Strategy Framework 2.0

The following provide the general framework for the NWT Greenhouse Gas Strategy:

2.1 Goals and Objectives

The overall goal of the NWT Greenhouse Gas Strategy is to control greenhouse gas emissions in ways that:

- reduce impacts on health and the environment;
- minimize impacts on the economy; and
- support Canada in meeting its obligations under the Kyoto Protocol.

The specific objectives of the NWT Greenhouse Gas Strategy are to:

- increase awareness in the NWT of the issue of global climate change and the need to control greenhouse gas emissions;
- engage all northerners including government, non-government, industry and the general public, to take action to control greenhouse gas emissions;
- identify and implement achievable and practical actions that can be undertaken immediately, as well as longer-term actions which will result in future, sustained reductions in greenhouse gas emissions in the NWT, taking into consideration the economic, environmental and social costs and benefits; and
- identify economic opportunities that may arise from the use of cleaner sources of energy and more efficient equipment and technology.

J. Nagy/GNWT

2.2 Principles

The Strategy and activities in the Action Plan were developed based on the following principles:

LEADERSHIP. The GNWT must demonstrate leadership by diligently and responsibly taking action to control emissions of greenhouse gases in the NWT.

INCLUSION OF STAKEHOLDERS. Residents, communities, industry and other affected groups must be provided with a meaningful opportunity to participate in the development of legislation, policy, strategies and other initiatives that will directly affect them.

COMPREHENSIVE APPROACH. The responsibility for meeting the goal and objectives of the Strategy must be shared by all sectors of society including governments, the private sector and the general public.

PHASED APPROACH. The Strategy should identify least-net-cost (economic, environmental, and social costs and benefits) measures first and adopt a long-term, responsible approach to achieving sustained greenhouse gas emission reductions.

BALANCED APPROACH. Controlling emissions must be done in ways that carefully considers sectoral and regional economies. All sectors and regions should do their part, but no region or sector should be asked to bear an unreasonable share of the burden of mitigative actions if such actions would prevent economic growth.

EFFECTIVENESS. Action should advance the environmental, economic and social goals of residents of the NWT, ensuring that the NWT's response to control greenhouse gas emissions is supportive of the overall priorities of the NWT.

ECONOMIC BALANCE. The Strategy must recognize that there may be financial costs in achieving the goal of controlling greenhouse gas emissions, but these costs must be balanced by the resulting environmental and social benefits.

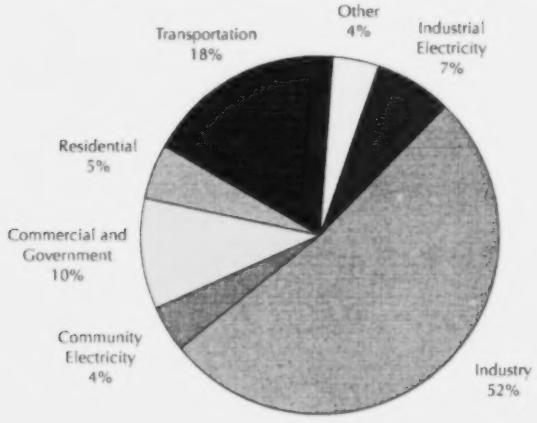
PRECAUTIONARY PRINCIPLE. Given the significant risk that climate change poses for human and environmental health, a "weight of evidence" or precautionary principle must be used to justify preventative actions rather than wait for full scientific certainty.

2.3 Emissions Inventory

Total emissions of greenhouse gases from the NWT in 2001 were 1,750 kilotonnes in carbon dioxide equivalents (CO_{2e}). Calculations from 2005, indicate that emissions have remained relatively stable since 2001. The 2006 greenhouse gas inventory will be completed in early 2007 as the required data become available. This will provide a better understanding of the change in emissions over time and allocation of fuel use between sectors and sub-sectors. Chart #1 shows the breakdown of emissions from various sectors in 2001.

The largest source of emissions in the NWT is the industrial sector at 1,050 kilotonnes (this includes industrial electricity generation and off-road diesel transportation). These total industrial sector emissions have remained relatively static since 2001, with offsetting changes within the mining industry and decreases in natural gas production. Mining, oil and gas sectors are currently equal in their split of industrial emissions. These sectors are expected to grow in the future and have the potential to dramatically increase NWT emissions.

Chart #1: NWT Greenhouse Gas Inventory, Fuel Use by Sector - 2001

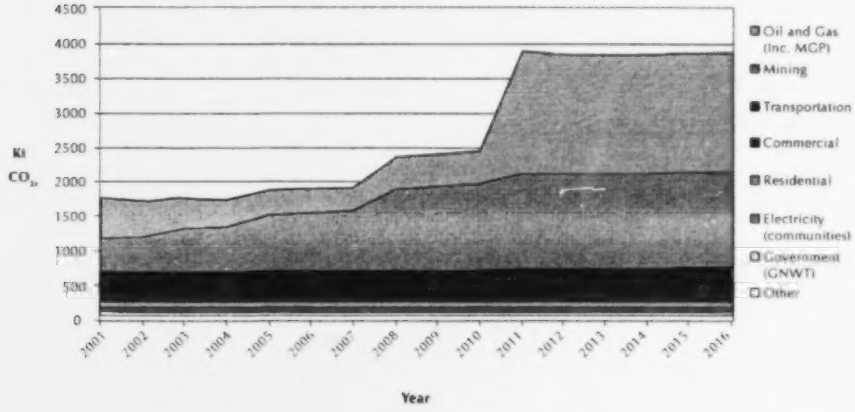


The transportation sector at 312 kilotonnes of greenhouse gas emissions also has significant emissions in the NWT, including marine, aviation and road travel (not including off-road diesel transportation). Fuel consumption for community electricity generation (66 kilotonnes), GNWT operations (55 kilotonnes), commercial and institutional sector (119 kilotonnes) and residential sector (80 kilotonnes) make up the remaining emissions.

Environment and Natural Resources has produced a forecast of emissions. This forecast uses conservative assumptions to build a business as usual scenario, which does not incorporate any new climate change measures. Estimates include expected growth rates in communities, production plans from established mines and emissions from proposed developments that are already in the environmental review process (including the Mackenzie Gas Project). Emissions forecasted 10 years into the future are shown in Chart #2. This forecast will be updated in 2007 when the new inventory is completed.

Chart #2 shows the projected increase in CO_{2e} for the NWT within the next 10 years. This chart indicates that residential, commercial, government, transportation, and electricity (for communities) produce a small portion of emissions. These emissions will grow slightly based on population growth and economic factors.

Chart #2: Emissions Inventory and Forecast (by Sector)



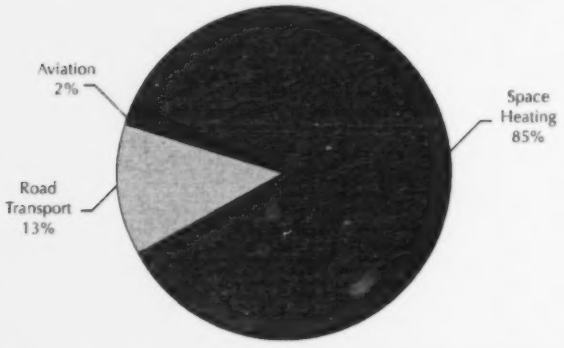
The mining sector shows a steady increase in emissions over the next 10 years. This sector has made progress towards greater efficiencies in operation, but with two new diamond mines, and several smaller mines slated to start operations within the next 10 years, emissions are projected to grow substantially.

The oil and gas sector has the potential to double or triple NWT emissions. Currently, this sector accounts for about one-quarter of the NWT's greenhouse gas emissions. If the Mackenzie Gas Project is approved, construction is slated to start in 2008 and operation would start in 2011. The Environmental Impact Assessment for the project predicts 1,700 to 2,000 kilotonnes of emissions starting in the base year of well production and operation of the pipeline.

Government of the Northwest Territories emissions from its own operations account for 55 kilotonnes per year, not counting indirect emissions for electricity purchased in communities.

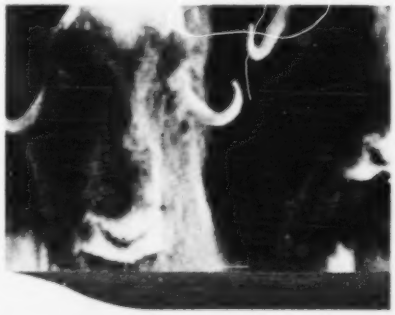
Chart #3 shows the 2004/2005 GNWT emissions by usage.

Chart #3: GNWT Greenhouse Gas Emissions By Usage



Space heating for GNWT building assets using heating oil, natural gas and propane account for 85% of these emissions. The government's vehicle fleet is the next largest source of emissions, both diesel and gasoline create 13% of emissions. Aviation (forest fire fighting) creates 2% of emissions from GNWT operations.

2.4 Forest Carbon Sinks and Sources



The vast forests and peatlands of the NWT are one of the largest terrestrial carbon banks on the planet. All plants are composed primarily of carbon. When plants grow they absorb carbon dioxide, and when they die the carbon is stored as organic matter in the dead wood, peat moss or soil. This storage in the natural environment is known as a carbon sink.

The natural environment can also act as a carbon source, for example when forest fires burn or the forest is harvested. The amount of carbon that cycles within the natural environment of the NWT is much greater than the amount of carbon released from the fossil fuels that we burn. Fossil fuel combustion adds to the total amount of carbon dioxide that is being cycled, but every year more carbon dioxide stays in the atmosphere because forests can't remove the extra gas fast enough.

The NWT greenhouse gas inventory only counts emissions from fossil fuels and some very specific categories of forest management practices, such as proscribed burning. Wood that is burned to heat our buildings is not counted because this is considered carbon neutral – although carbon dioxide is released when you burn a tree, the emissions are considered part of the natural cycle and it is assumed that firewood emissions are absorbed back into the forest as new trees grow.

Globally, about 80% of the measured increase in atmospheric greenhouse gas levels is attributed to fossil fuel burning, with the remaining 20% attributed to land use changes and deforestation. For this reason, forest management has become an important consideration in agreements such as the Kyoto Protocol.

Specific rules and definitions have been developed to provide an international accounting of natural carbon sinks, such as forests. The GNWT Department of Environment and Natural Resources is working to assess the carbon sink status of forests in the NWT. This information will be added to similar studies being conducted in all Canadian provinces and territories that are being coordinated through the Canadian Council of Forest Ministers. Canada will determine how to count its forest sinks for international emission reporting purposes in 2007.

Future conditions (such as large forest fires) may change NWT's forests from a sink to a source. The sink/source balance in the NWT is further complicated by uncertainties related to climate change. For example, methane (a potent greenhouse gas) is released in substantial quantities from peat bogs as the permafrost melts.

2.5 Targets and Measures

- **The GNWT will reduce greenhouse gas emissions from its own operations by 10% below 2001 levels by the year 2011.**
- **The GNWT encourages all other sectors to develop their own emission management plans and targets.**
- **In 2010, the GNWT will review progress of the NWT Greenhouse Gas Strategy and set longer-term targets beyond 2011.**

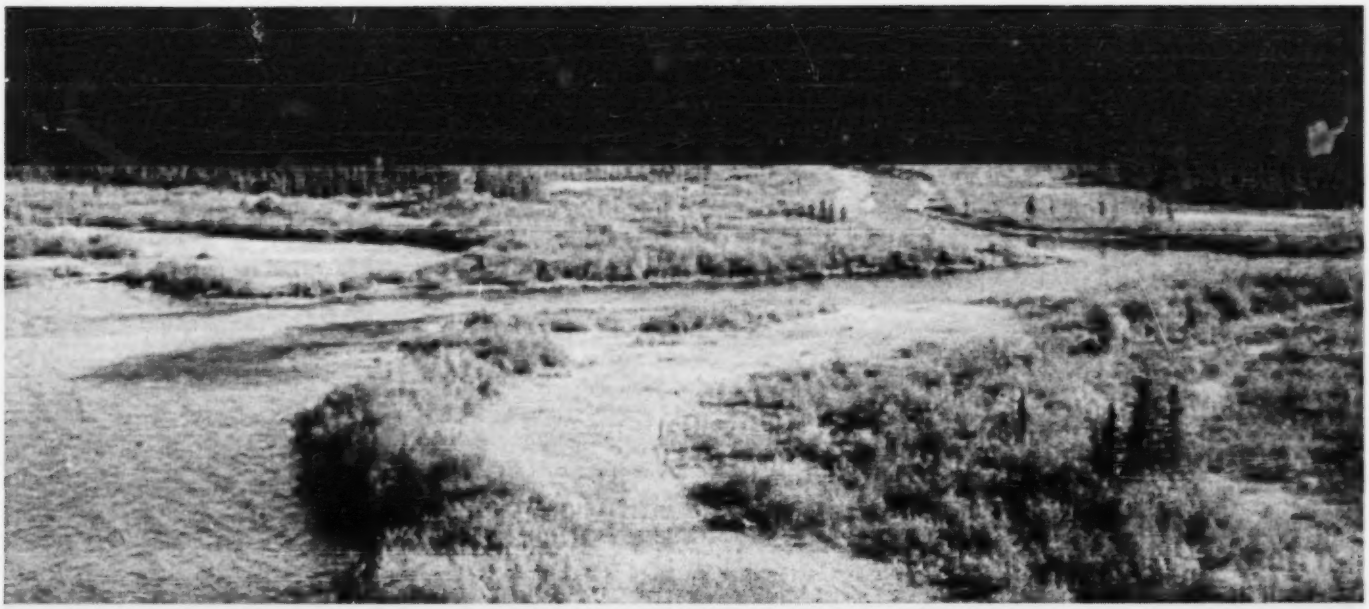
The GNWT will reduce its total emissions to 10% below 2001 levels within the next 5 years. This will be achieved through efforts described in the Action Plan that is outlined in section 3.0. Achieving these short-term targets will not reduce total NWT emissions because planned economic growth over this period will continue to outpace emission reductions.

The GNWT recognizes that some communities and companies in the NWT have already set their own targets to control greenhouse gas emissions. The GNWT will strengthen existing partnerships and establish new partnerships with other sectors of the NWT economy controlling their own emissions.

The Action Plan includes measures to support local initiatives and new partnerships to control emissions. All parties are encouraged to set their own targets if they have not already done so.

Both emissions and actions taken in the NWT will be tracked to provide a review of progress in 2010 and to inform the setting of new targets past 2011.

As a region highly affected by climate change, the GNWT will continue to support Canada's sustained commitment to international treaties to reduce greenhouse gases. Actions that are taken in the NWT will count towards Canada's overall national efforts to meet these commitments.



Action Plan 3.0

The overall goal of the NWT Greenhouse Gas Strategy is to "mitigate" or control greenhouse gas emissions. For the period 2007 to 2011, actions summarized as ongoing represent a continuation of various emission reduction efforts initiated under the original Strategy or stemming from other energy and economic initiatives. New actions to control greenhouse gas emissions are also described.

A more comprehensive description of each action, including implementation details, is provided in Appendix 2.

3.1 Community and Residential Sector

Actions:

1. **EnerGuide for Houses**
2. **NWT Housing Corporation Energy Conservation Initiatives**
3. **Community Woodlot Planning**
4. **Community Energy Planning**
5. **Energy Efficiency Financing Assistance Program**

Greenhouse gas emissions associated with space heating for buildings in the community and residential sector of the economy are estimated to be less than 5% of the NWT's annual emissions total.

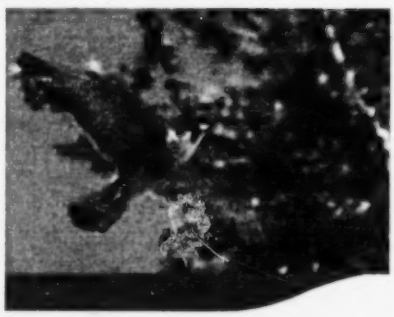
Efforts to manage energy use and emissions in homes and community buildings often provide economic savings to consumers in addition to reducing environmental impacts. A number of programs are in place to assist residential energy users throughout the NWT.

There are several programs that focus on retrofitting existing homes for energy efficiency. Arctic Energy Alliance delivers the **EnerGuide for Houses** program for residential homeowners, which has provided home audits to almost 450 homes in the NWT. The GNWT is developing an **energy efficiency financing assistance program** to fund energy efficiency improvements for residents.

The **NWT Housing Corporation (NWTHC)** has responsibility for over 3,000 houses in the NWT. It has a variety of energy conservation initiatives aimed at increased efficiency and technology in its buildings. Efforts range from the installation of low volume flush toilets to high efficiency residential heating systems. NWTHC promotes energy conservation and awareness, as well as education through workshops with the Arctic Energy Alliance, local housing organizations and public housing tenants.

The Gas Tax Funding Agreement with the Government of Canada provides all community governments in the Northwest Territories with funding to support environmentally sustainable municipal infrastructure. The Agreement requires all communities to develop an Integrated Community Sustainability Plan (ICSP) by March 2010. One element of the ICSP is that all communities must complete a **Community Energy Plan**. The funding provided under the Gas Tax Agreement can be used to implement the capacity and infrastructure components of these plans. The GNWT Department of Municipal and Community Affairs is working with the Arctic Energy Alliance to support communities to achieve this objective.

Environment and Natural Resources conducts **community woodlot planning** for communities who use cordwood for space heating.



3.2 Commercial and Industrial Sector

Actions:

6. **Commercial Energy Efficiency Audits**
7. **Support Industry Energy Efficiency Activities**
8. **Air Quality and Emission Management Code of Practices for the Upstream Oil and Gas Industry in the NWT**
9. **NTPC Emissions Reduction Initiative**

In recent years, the NWT economy has enjoyed significant growth, largely due to oil and gas development, diamond mining and other mineral production. In 2001, emissions from all industrial sources accounted for over 50% of the NWT's total annual emissions. Looking to the future, development in the mining sector and the approval of the proposed Mackenzie Gas Project has the potential to double or triple annual emissions in the NWT.

Environment and Natural Resources will continue to push for greater controls on emissions from the oil and gas industry. This will be accomplished by playing a role in the regulatory review and environmental assessment of new projects and by the development of a new **air quality and emission management code of practices for the upstream oil and gas industry in the NWT.**

Industrial firms that emit more than 100 kilotonnes of greenhouse gases are now required by the federal government under the *Canadian Environmental Protection Act* to provide annual emission reports to the Canadian Greenhouse Gas Registry. The federal *Clean Air Act* will provide more detail on how industrial emissions will be regulated as it is further developed. The GNWT will work to ensure that NWT industries are assigned an equitable share of Canada's burden to achieve emission reductions under a national plan.

Diamond mines in the NWT are modern facilities, designed to be energy efficient due to costs incurred in hauling their fuel across long winter roads. Mines have been progressive in adopting new energy efficient technologies and continue to run employee awareness programs to minimize fuel use during operations. BHP Billiton's Ekati Mine had registered plans to control greenhouse gas emissions under Canada's Voluntary Challenge and Registry (VCR) program.

Ekati has also made investments in generator efficiency improvements, using residual heat for underground operations and space heating for buildings, burning waste oil for heat, and a commitment to explore wind energy. All these projects have led to overall fuel savings of three million litres of total fuel consumption up to 2006. This helps Ekati's bottom line, helps deal with fuel shortages caused by shortened ice road seasons and helps the mine boost morale at the same time as reducing greenhouse gases.

The **NWT Power Corporation (NTPC)** has decreased emissions from its operations 44 % to 79 kilotonnes in 2004/2005 (actual emissions vary from year to year depending on water conditions for hydroelectric production). NTPC exceeded its own corporate target under the VCR program. The reduction resulted from concerted efforts by NTPC to reduce its use of diesel fuel, either by developing hydroelectricity and natural gas generating capacity replacing diesel generation, or by improving plant efficiencies within diesel-fired communities.

The NTPC emission reduction was helped by the closure of two gold mines in Yellowknife in the late 1990s and early 2000s that reduced the need for diesel power generation at the Jackfish power plant. NTPC also performs both residential and commercial energy audits and they provide conservation information to customers on a regular basis. All but three NWT communities have been converted to more efficient streetlights.

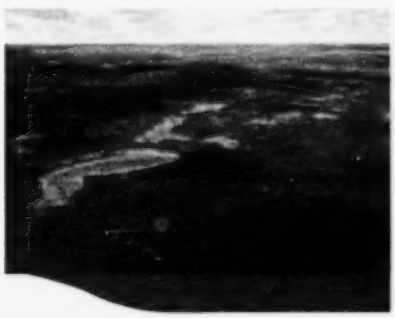
The commercial sector of the economy contributes roughly seven % of the total NWT emissions. The Northwest Territories Power Corporation and Arctic Energy Alliance, through their **commercial energy efficiency audits** and advisory services, offer a service to the commercial industry aimed at reducing energy use in commercial buildings.

Ekati Mine Energy Smart Program

Industry has not been standing still on greenhouse gas reductions. Ekati mine employees initiated the 'energy smart program' in 2002, with the goal to reduce energy use at the mine. Their early goal was to reduce one megalitre (1 million litres) of fuel per year and to foster employee commitment to energy efficiency.

Ekati employees have responded with hundreds of suggestions, which have led to changes such as waterless urinals, low flow toilets and showerheads, motion detector lights, LCD monitors and a commitment to not idle vehicles.

3.3 Government Sector



Actions:

10. Hybrid Vehicle Testing
11. Department of Transportation Energy Saving Initiatives
12. Energy Performance in Government Buildings
13. Utility Tracking System
14. Energy Performance in New Facilities
15. Green Procurement Guide
16. Electrification of Heat Loads
17. Forest Management

The GNWT owns or controls a large number of energy-consuming assets (mostly buildings, heavy equipment and transportation vehicles) and plays a significant role in the design, construction or funding of new assets. As a result, the GNWT has been engaged for many years in ongoing efforts to manage its energy use and emissions.

Significant efforts are made to design and construct for higher **energy performance in new government buildings** and facilities. The GNWT's *Good Building Practice for Northern Facilities* provides guidance to achieve a level of energy performance under northern conditions using the Model National Energy Code for Buildings (MNECB) as the

performance standard. Executive Council approval of funding requests for new facilities requires a level of energy performance that is 25% better than the MNECB. The goal is to minimize the total cost of a building over its life while reducing environmental impacts, energy consumption and ensuring operational sustainability.

Financial Management Board Secretariat (FMBS) is developing a **'green procurement policy'** to ensure all purchases by the GNWT take into account environmental factors. FMBS is also working on expanding the use of the **utility tracking system**, which will assist Environment and Natural Resources to track greenhouse gas emissions from government operations.

There are significant improvements possible in the **energy performance of government buildings**. The GNWT has several programs, through Public Works and Services, Environment and Natural Resources and the Arctic Energy Alliance, to conduct audits and provide retrofits for government buildings, which are not performing to high energy efficiency standards.

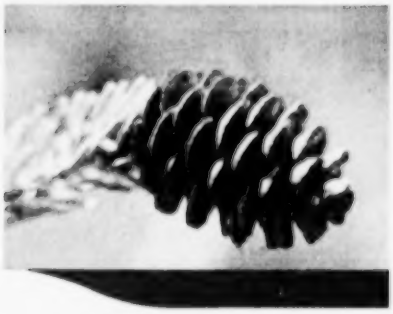
The NTPC is working with Public Works and Services to use excess hydroelectric production from the Taltson River system for the **electrification of heating loads** of buildings in the town of Fort Smith. This project will reduce heating fuel requirements significantly, replacing it with emission-free hydroelectric power.

The transportation sector releases 18% of the total NWT greenhouse gas emissions. When off-road transportation is included this rises to about 30%. Transportation is a challenging sector to address in the NWT because of the long distances between communities and dependence on air travel in many areas that do not have all-weather roads.

The **Department of Transportation's energy saving initiatives** include a GNWT vehicle policy to ensure proper maintenance and operation of vehicles, and the Intelligent Transportation System aimed at the trucking industry. The Department of Transportation, Environment and Natural Resources and Parks Canada are also testing **hybrid vehicles** for northern condition suitability.

The Forest Management Division of Environment and Natural Resources is working to assess the status of northern forests as a carbon source or sink which could play an important role in our carbon balance accounting.

3.4 Cross-cutting



Clean Energy Actions:

18. **Residual Heat Recovery**
19. **Combined Heat and Power**
20. **Hydroelectric Development**
21. **Mini-Hydroelectric Development**
22. **Wind Energy Development**
23. **Ground Source Heat Pumps**
24. **Photovoltaics**
25. **Solar Hot Water Heating**
26. **Distributed Generation Guidelines**
27. **Biofuels**
28. **Biomass**
29. **Alternative Energy Technologies Program**

The NWT's current electricity mix is approximately 43% hydro, 38% diesel and 19% natural gas. From 1996 to 2001, the annual greenhouse gas emissions resulting from the generation of electricity increased 34%, mostly due to on-site diesel-electric plants installed in remote locations by the new diamond mines.

NTPC has completed numerous initiatives to reduce greenhouse gases from its operations. One efficiency measure uses **residual heat recovery** from generators to warm their buildings and in a few communities this heat is also used to warm nearby buildings. The diamond mines have also been very effective at capturing residual heat to warm their buildings. Using this source of heat reduces the need to burn diesel for direct heating purposes.

NTPC has also installed and operates **combined heat and power** (CHP) natural gas fired turbines in the Inuvik Recreational Centre. This emerging technology could have greater application if more communities get access to natural gas or as technical progress is made in introducing diesel fired CHP units.

Two diamond mines were constructed and became operational in the NWT by 1996. A third diamond mine is under construction and a fourth mine has begun seeking environmental approval. The growth in load demand improves the economics for construction of a transmission line and installation of increased generation capacity at the Taltson facility.

The provision of **hydroelectricity** to the diamond mines and to the proposed Mackenzie Gas Project represents significant opportunities to reduce emissions resulting from power generation at industrial sites and to control future growth in emissions. The NWT Energy Corporation (NTEC) and its Aboriginal partners are actively pursuing these opportunities.

The feasibility of **mini-hydroelectric projects** in Whatì, Gameti, Łutselk'e and Kakisa are also being assessed. Run-of-river mini-hydro provides diesel dependent communities an opportunity to remove their dependence on diesel fuel, with minimal environmental consequences.

Environment and Natural Resources will develop an **alternative energy technologies** program to fund renewable energy development in the NWT. Other ongoing efforts to develop alternative energy options include the development of wind energy in the NWT. The establishment of a wind-monitoring program is helping to determine where viable wind resources are located in the territory. Other efforts are underway to determine the potential use of **ground source heat pumps** for space heating and to increase the use of photovoltaic panels.

Did you know that 17 NWT communities have buildings with Solar Hot Water Heating systems, offsetting over 50% of a building's annual hot water heating costs?

Solar hot water heating technologies that reduce fuel use are being tested in social housing units. Public Works and Services are testing biomass technology to supply heat directly into building heating systems from wood pellet boilers located outside the building. A contract with a local business provides wood pellets from northern Alberta at a price roughly 10 cents/litre cheaper than heating oil.

Switching to **biofuels** such as ethanol blend gasoline or biodiesel can reduce greenhouse gas emissions. The NWT Power Corporation is investigating biofuels for possible use in their diesel generators, and the Department of Transportation is investigating the cold weather use of biofuels for passenger vehicles and trucks. These fuels may become available in the NWT as federal regulation comes into force that requires an average content in the Canadian supply.

Regulation will also play a role in smoothing the transformation to a cleaner renewable energy future. The GNWT and the NTPC are working on removing the barriers for businesses and individuals to sell power into the territorial power grid. **Distributed generation guidelines** are being developed to facilitate renewable power integration into the NWT energy marketplace.

Conservation and Efficiency Actions:

30. **Energy Conservation Program**
31. **Driver Training and Information Programs**
32. **Active Transportation**
33. **Energy Conservation Education and Awareness**
34. **Climate Change Education in Schools**
35. **Energy Efficiency Standards**
36. **Northern Research into Energy Technologies**
37. **Support for Arctic Energy Alliance**
38. **Greenhouse Gas Emission Inventories**
39. **Climate Change Network**

Energy conservation and efficiency is the cheapest and easiest way to reduce energy costs in the NWT. Any time you can reduce energy use you are making available an equal amount of energy, which can be used elsewhere. The GNWT is promoting efforts to address energy efficiency and conservation. Environment and Natural Resources **'Energy Conservation Program'** funds energy efficiency improvements, retrofits and workshops for government, community and non-profit organizations.

The Arctic Energy Alliance and Aurora Research Institute are active in **northern research into energy technologies**. Funding from GNWT member departments supports the Arctic Energy Alliance. This funding provides a basis for the Alliance to deliver additional federally funded programs. Arctic Energy Alliance also provides education and awareness programs to northern residents for energy efficiency, active transportation, and driver training and information programs.

The Department of Education, Culture and Employment has a number of school-based curricula that address **climate change education in the NWT**. Students begin to learn about environmental issues in early elementary. The science of climate change and the accompanying social issues are introduced in late elementary school and are expanded upon in middle school. At the high school level, climate change mitigation and adaptation topics are explored in detail.

A key finding in the 2005 Greenhouse Gas Strategy Review Report involved the need to improve communications and coordination among the many groups involved in emission mitigation work. As well, the GNWT recognizes the need to undertake more detailed monitoring and tracking of NWT greenhouse gas emissions to provide better information on the sources and levels of emissions and how these emissions may be managed in the future.

Environment and Natural Resources will establish a **Climate Change Network** to improve communications and coordination, improve monitoring and tracking, and to support increased efforts to address adaptation to climate change impacts in the NWT.

Environment and Natural Resources will continue to prepare **greenhouse gas emission inventories**. The 2006 Inventory will be prepared in 2007 when data for the calendar year becomes available.

3.5 Summary of Actions

All of the actions described in this Strategy will lead to reductions of greenhouse gas emissions. Some actions will provide direct emissions reductions such as EnerGuide for Houses, NTPC's emission reductions initiative, electrificion of heat loads and retrofits funded through the Energy Conservation Program.

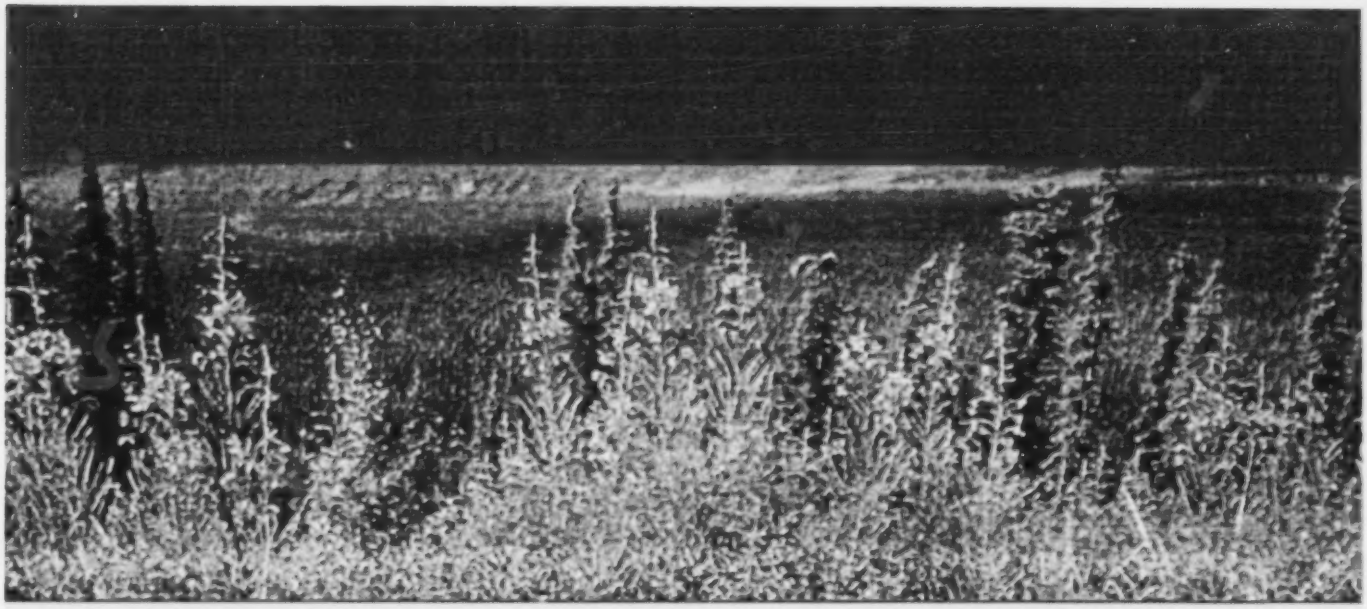
Less direct emission reductions include support for Arctic Energy Alliance, energy conservation education and awareness, and energy performance standards. Education, training and policy are fundamental to changing attitudes and values that lead to greenhouse gas reductions, as well as assisting in the testing and training needed to use new technoloies. Actions described in Appendix 2 include a section detailing greenhouse gas reduction potential.

Table 2 summarizes the ongoing and new actions to be implemented as part of this Strategy. A detailed explanation of each action is available in Appendix 2.

Table 2: Summary of Actions

	Implementation		
	Lead Agency	Status	
		On-going	New
COMMUNITY AND RESIDENTIAL SECTOR			
1. EnerGuide for Houses	AEA	✔	
2. NWT Housing Corporation Energy Conservation Initiatives	NWTHC	✔	
3. Community Woodlot Planning	ENR	✔	
4. Community Energy Planning	MACA	✔	
5. Energy Efficiency Financing Assistance Program	ENR		✔
COMMERCIAL AND INDUSTRIAL SECTOR			
6. Commercial Energy Efficiency Audits	AEA	✔	
7. Support Industry Energy Efficiency Activities	ITI/ENR	✔	
8. Air Quality and Emissions Management Code of Practices for the Upstream Oil and Gas Industry in the NWT	ENR		✔
9. NTPC Emissions Reduction Initiative	NTPC	✔	
GOVERNMENT SECTOR			
10. Hybrid Vehicle Testing	DOT/ENR	✔	
11. Department of Transportation Energy Saving Initiatives	DOT	✔	
12. Energy Performance in Government Buildings	PWS	✔	
13. Utility Tracking System	PWS/FMBS	✔	
14. Energy Performance in New Facilities	PWS	✔	
15. Green Procurement Policy	FMBS		✔
16. Electrification of Heat Loads	PWS/NTPC		✔
17. Forest Management	ENR		✔

	Implementation		
	Lead Agency	Status	
		On-going	New
CROSS-CUTTING			
CLEAN ENERGY			
18. Residual Heat Recovery	NTPC	✔	
19. Combined Heat and Power	NTPC	✔	
20. Hydroelectric Development	NTPC	✔	
21. Mini-Hydroelectric Development	NTPC	✔	
22. Wind Energy Development	ENR	✔	
23. Ground Source Heat Pumps	ENR	✔	
24. Photovoltaics	ENR	✔	
25. Solar Hot Water Heating	ENR	✔	
26. Distributed Generation Guidelines	NTPC	✔	
27. Biofuels	NTPC/DOT		✔
28. Biomass	PWS/ENR		✔
29. Alternative Energy Technologies Program	ENR		✔
CONSERVATION AND EFFICIENCY			
30. Energy Conservation Program	ENR	✔	
31. Driver Training and Information Programs	DOT	✔	
32. Active Transportation	AEA	✔	
33. Energy Conservation Education and Awareness	ENR	✔	
34. Climate Change Education in Schools	ECE	✔	
35. Energy Efficiency Standards	PWS	✔	
36. Northern Research into Energy Technologies	ARI	✔	
37. Support for Arctic Energy Alliance	Various	✔	
38. Greenhouse Gas Emission Inventories	ENR	✔	
39. Climate Change Network	ENR		✔



Implementation
4.0

4.1 Communication and Coordination

Given the number of actions underway to reduce emissions and the different organizations involved, the GNWT recognizes that communication and coordination among the groups is vital to ensure consistency and avoid duplication.

To the extent possible, the implementation of the actions in this Strategy will occur on a cooperative and collaborative basis involving a wide range of government, non-government, business and other groups. As noted earlier, a Climate Change Network will be created to provide communications and coordination support to the various organizations involved in greenhouse gas mitigation and other climate change activities in the NWT.

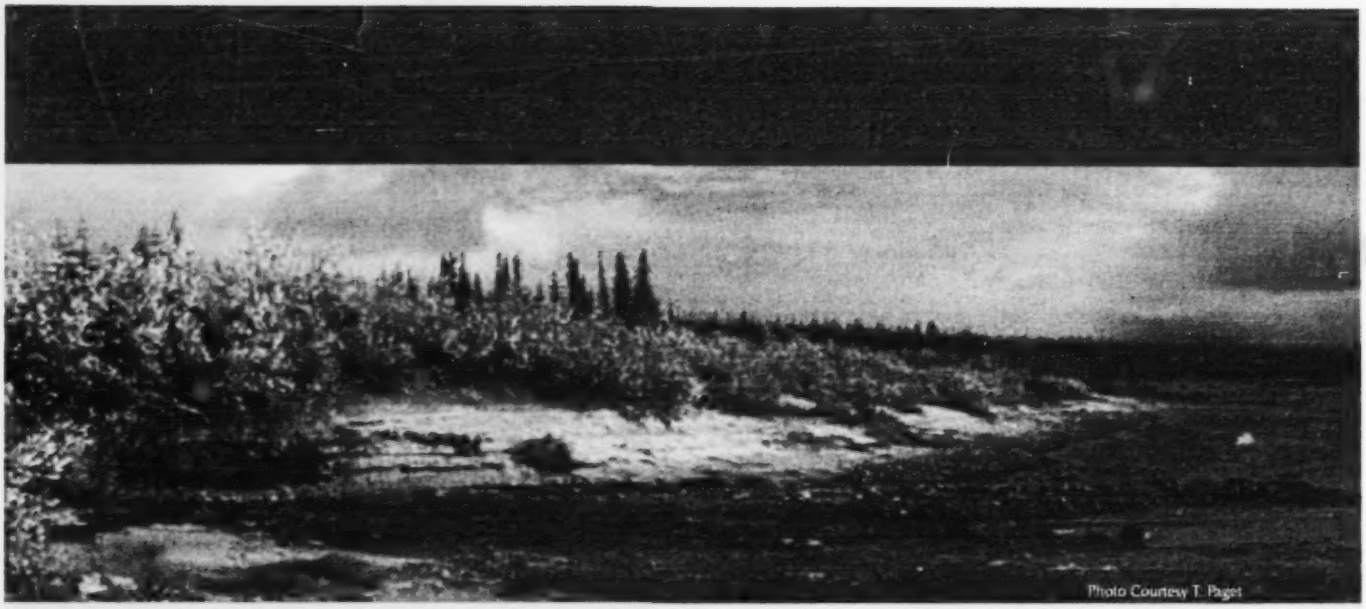
4.2 Monitoring and Reporting

The Climate Change Network will establish a web site to highlight and report on progress. Detailed descriptions of actions described in Appendix 2 of this document will be updated in future internet based editions. Partners are encouraged to contact the Climate Change Network if they want descriptions of their actions included.

4.3 Review of Progress

The NWT Greenhouse Gas Strategy will continue to be a "living document" that can be revised in future years, as more information becomes available. Changes in either the national and international context, in the knowledge base (science, analysis of impacts and technological advances) or the NWT energy sector may require that the Strategy be updated. Actions will need to be refined as new knowledge is gained and as new technologies and practices become available.

To track progress on an annual basis and prepare for the completion of another review of the Strategy starting in 2010, the NWT Climate Change Network will assume a lead role in collecting and documenting relevant information on all mitigation measures undertaken in the NWT.



Impacts and Adaptation 5.0

Current understanding of climate science indicates that the build-up of greenhouse gases already in the atmosphere will continue to affect global climate for centuries to come.

The GNWT accepts the scientific evidence and traditional knowledge indicating that the effects of climate change are already being felt in the North and will likely be more severe in the NWT than other parts of Canada. The potential impact of climate change on the North's natural environment, our economy, infrastructure and people with traditional lifestyles is a vital concern to the GNWT.

During the 2005 Review, there was a strong consensus that a companion NWT Climate Change Impacts and Adaptation Strategy needs to be developed to identify key objectives and required actions that will help prepare the NWT to adapt to impacts related to climate change.

Stakeholder discussions towards the development of an impact and adaptation plan will be initiated by Environment and Natural Resources upon implementation of the renewed NWT Greenhouse Gas Strategy.

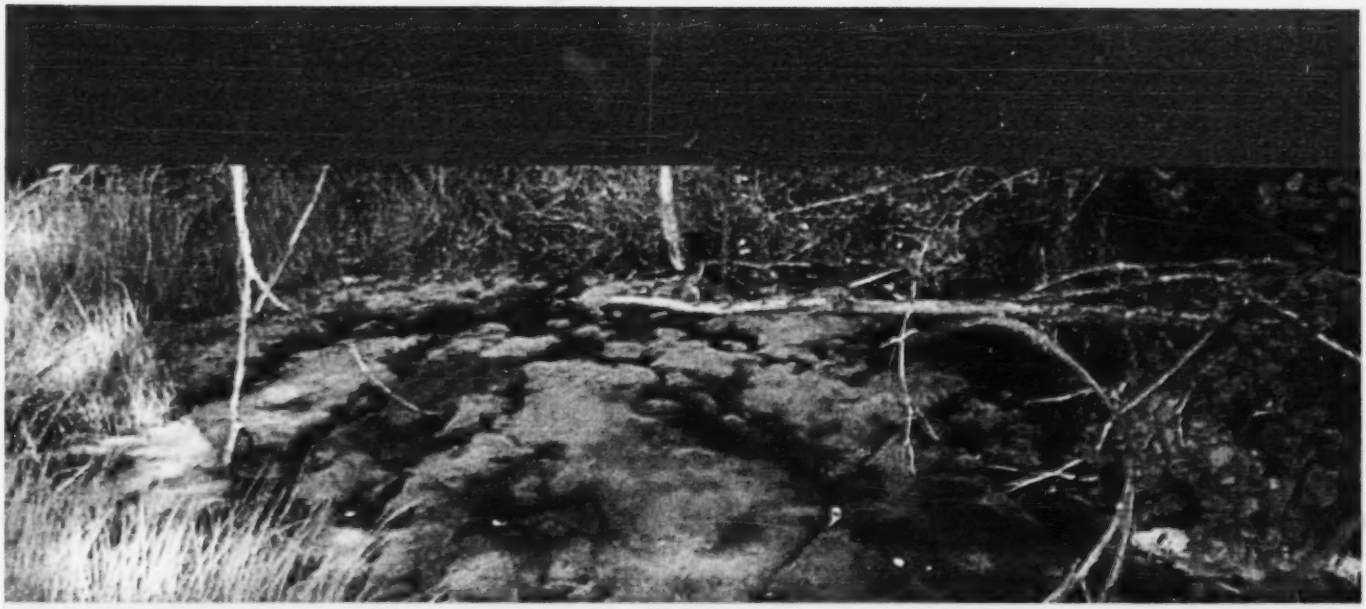
Appendix 1

GNWT Official Statement on Climate

GNWT Official Statement on Climate

In October 1998, the GNWT adopted the following official position on climate change. This position was reconfirmed by Executive Council in November 2004.

> **Climate change is a serious concern that could in future significantly disrupt the global environment, affecting the ability of northerners to lead healthy and productive lives. This potential disruption of our environment compels the Government of the Northwest Territories (GNWT) to support global and local actions to reduce emissions of the greenhouse gases believed to cause enhanced climate change. These global actions include the Kyoto Protocol negotiated under the United Nations Framework Convention on Climate Change.**
>
> **The GNWT recognizes that it has a responsibility to contribute to this initiative in order to support Canada's position as a leader among nations in protecting the global environment. The government is committed to working with the federal and provincial governments to develop an equitable approach to Canada's international commitment to reduce national emissions to six % below 1990 levels by the year 2013.**
>
> **Actions in the Northwest Territories to control northern greenhouse gas emissions will be developed in cooperation with a broad range of stakeholders. These actions will be implemented in a manner that reduces the negative impacts on our health and environment, minimizes negative impacts to our economy, and takes advantage of the economic opportunities that will result from the use of more efficient equipment and materials.**



Appendix 2

Detailed Explanation of Actions

Action #1 EnerGuide for Houses

Description

The Arctic Energy Alliance (AEA) is the NWT delivery agent for the EnerGuide for Houses (EGH). EGH was designed by Natural Resources Canada to determine the quality of the housing stock in Canada and to give homeowners information and incentives to renovate their house for energy efficiency.

EGH advisors visit homes with specialized equipment and provide an initial assessment of the energy efficiency of the house (the "A" evaluation). An EnerGuide rating out of 100 is provided for the house, and a series of possible renovations are modelled in a computer program to determine energy savings if the home is renovated. When homeowners have completed the renovations they contact the EGH advisor and a "B" evaluation is done. Based on the improvement in the energy performance of the house, homeowners have received grants to help pay for the work they did.

The Government of the Northwest Territories (GNWT) has provided funding to AEA to ensure that the EGH program is available to all residents no matter which NWT community they live in. The program has been highly successful in the Northwest Territories where a combination of harsh climate and high fuel prices make space heating a major expense to homeowners.

Recently, the federal government announced the ecoENERGY Efficiency Initiative, which includes ecoENERGY Retrofit, providing financial support for energy retrofits in homes, as well as in small buildings and industries.

Outcome

- 446 "A" evaluations were completed in the NWT up to March 2006.
- 86 "B" evaluations (follow-up) were completed up to March 2006.
- In 2007/2008 160 "A" audits and 60 "B" audits are to be completed.
- A 30% increase in audits conducted outside of Yellowknife.

Greenhouse Gas Reduction Potential

- Average reductions were 2.73 tonnes of CO_2 for every house that completed the recommended renovations and followed up with a "B" evaluation.
- In 2006 a reduction of 234 tonnes were realized from 86 homes that completed the "B" evaluation. With continuation of the EGH until 2011 and similar uptake, a cumulative reduction of 3.5 kilotonnes could be achieved.

Implementation

- AEA is the delivery agent for EGH in the NWT.

Linkages

- EGH ratings provide a tool to measure energy performance against the Model National Energy Codes. They can be used as a basis to reference building codes.

Action #2 NWT Housing Corporation Energy Conservation Initiatives

Photo Courtesy NWTHC

Description

The Northwest Territories Housing Corporation (NWTHC) Energy Conservation Initiatives can be organized under two headings: energy efficient technology for buildings and energy conservation and awareness education.

NWTHC incorporates the latest in energy saving technology into its building designs. Starting in 2005, NWTHC adopted the assessment methods of EnerGuide for Houses to evaluate energy efficiency. Low volume flush toilets have been installed and tested in several homes to determine water conservation values. In addition a 'grey water recycling project' is underway to develop a water recycling system that will reduce the cost of water and increase the quantity available for use by tenants. NWTHC has also taken the lead in the installation and evaluation of solar hot water heating units and has ordered and/or installed 11 panels in various communities. NWTHC is testing new technologies such as Conematic high efficiency residential heating systems. Wood burning stoves are offered with home ownership packages, which allow owners to heat using carbon neutral wood.

Energy conservation and awareness education are fundamental practices at NWTHC. NWTHC has teamed up with agencies, including the Arctic Energy Alliance, to analyze utility consumption data and host energy conservation workshops for local housing organization staff and public housing tenants. As a result, a *Code of Best Practices* was developed for the participating communities of Aklavik and Fort McPherson. Other workshop topics include the "Energy Star" appliance rating system and, most recently, a home maintenance and repair course for clients wishing to access home ownership funding. A significant portion of the course will focus on energy conservation.

NWTHC is preparing to undertake a comprehensive survey of its 2,310 public housing units in order to assist the energy conservation upgrades that have been carried out by local housing organizations to date.

Outcome

- The results of the survey will indicate the overall level of energy efficiency in public housing and will enable NWTHC to target specific units for additional upgrades.
- A Status Report on Energy Efficiency for Public Housing to be developed in 2007; energy efficiency projects implemented in 2008.

Greenhouse Gas Reduction Potential

- Determining greenhouse gas reductions that have resulted from past initiatives is difficult to quantify, however, as data collection and monitoring efforts increase, a baseline can be developed to compare against.

Implementation

- NWTHC will work with AEA to develop the curriculum that will be used to train employees to inspect houses, collect data and pass energy awareness information to the tenants.

Linkages

- The president of the NWTHC sits on AEA board of directors.
- EGH

Photo Courtesy Jim Sparling

Action #3 Community Woodlot Planning

Description

Environment and Natural Resources (ENR) Forestry Division is involved in the active management of many forests in the NWT. Every community in the forested zone makes some use of its forest resources for space heating.

In the past there has been little management of woodlots outside of the larger centres. This is changing with many communities requesting ENR to undertake "community woodlot planning" to determine the maximum sustainable harvest and determine the forest locations best suited to harvesting.

Outcomes

- Whatì and Aklavik have already completed woodlot planning, with several more communities in the planning stage.

Greenhouse Gas Reduction Potential

- Burning wood for space heating creates zero greenhouse gas emissions (assuming forests are replaced). Community woodlot planning can promote sustainable forest yield while offsetting heating oil used for space heating.

Implementation

- ENR and communities

Linkages

- Forest management, in particular forest fire management, is an important linkage with community woodlot planning. All forests within a 50 km radius of communities are managed by the forest service of ENR.
- High efficiency wood stoves require less wood to heat a building and reduce air pollution.
- Community Energy Planning initiatives, which are being implemented by AEA and Municipal and Community Affairs (MACA) to access the federal government's gas tax money, includes community woodlot planning as a step in the planning process.

Action #4 Community Energy Planning

Description

Community Energy Planning (CEP) is the process a community goes through to assess their energy use and energy mix and to create a more sustainable energy plan for the future. Community energy planning got its start in the NWT with the non-profit organization Ecology North and the community of Whatì. The Whatì CEP was completed in 2004, and led to considerable energy savings and awareness in the community, along with a community initiative to develop a local mini-hydroelectric plant.

In 2004 ENR and Indian and Northern Affairs Canada (INAC) funded AEA to provide a full-time position to coordinate CEP. In 2006, the City of Yellowknife adopted their CEP, which encompasses all energy use within the municipal boundaries. Five more communities are now working towards their CEP.

The Gas Tax Funding Agreement with the Government of Canada provides all community governments in the Northwest Territories with funding to support environmentally sustainable municipal infrastructure. The Agreement requires all communities to develop an Integrated Community Sustainability Plan (ICSP) by March 2010. One element of the ICSP is that all communities must complete a **Community Energy Plan**. The funding provided under the Gas Tax Agreement can be used to implement the capacity and infrastructure components of these plans. MACA is working with the AEA to support communities to achieve this objective.

Outcome

- Whatì and Yellowknife have completed their Community Energy Plans. Communities working towards their CEP include Fort McPherson, Déline, Gamètì, Norman Wells and Enterprise.
- All NWT communities should have CEPs complete by 2010 as a requirement of the Gas Tax Agreement.
- Ten CEPs completed per year; all NWT communities will have CEPs in place by 2010.

Greenhouse Gas Reduction Potential

- The potential for greenhouse gas reductions from CEP is substantial. The City of Yellowknife targets for 2014 are 20% reduction within city operations and 6% reduction city-wide.

Linkages

- AEA and MACA
- CEP encompasses all energy-related activities occurring within a community.

Action #5 Energy Efficiency Financing Assistance Program

Description

The GNWT is developing a new energy efficiency financing assistance program. The final details of implementation are currently being developed.

The new program's objective is to assist with the high costs of energy in the private residential sector. It will focus on reducing greenhouse gas emissions and fossil fuel use in the residential sector by targeting energy efficiency improvements and conservation. The energy efficiency financing assistance program will complement EGH by creating additional incentives for energy saving retrofits and equipment. Taking into account the high costs of transportation and materials in NWT's remote communities, this program will aim to equalize the costs of energy efficiency retrofits and appliances throughout the territory. The program will also provide incentives for the purchase of new hybrid vehicles.

Outcome

- The objective of this program is to reduce the high cost of energy and reduce associated greenhouse gas emissions.
- Grants will povide an incentive for annual energy-saving investments by residents.

Greenhouse Gas Reduction Potential

- Building upgrades such as window replacement, weather striping or added insulation save up to 20% on energy costs resulting in similar greenhouse gas reductions.
- Upgraded furnaces can save up to 30% on space heating costs, resulting in similar greenhouse gas reductions
- This program would lead to direct savings in the transportation sector. For example, in 2004 there were 33,642 registered vehicles in the NWT. If 10% of these were replaced by mid-sized hybrids, emissions would be reduced by 5.7 kilotonnes per year.

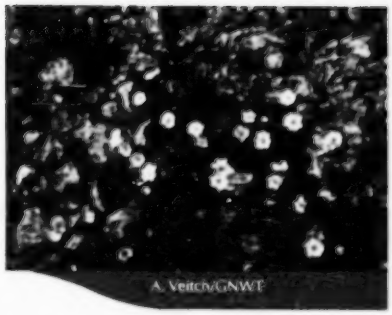
Implementation

- ENR will deliver the program.
- Partnerships will be established with northern retailers to reduce the costs of goods and services which increase energy efficiency.

Linkages

- EGH
- AEA

Action #6 Commercial Energy Efficiency Audits



Description

A commercial energy audit is a detailed assessment of a commercial or institutional building. There are three levels of assessment available for commercial buildings and the building operator is charged a fee based on the size of the building and level of assessment provided. The audits examine electrical systems, mechanical systems, utility bills, the building envelope, and energy efficiency in general. This information is rolled into a report, which is provided to the building operator with detailed energy usage and recommendations for energy efficiency.

AEA conducts commercial building audits. In the past two years 32 buildings were audited, plus reviews of previous recommendations for 12 City of Yellowknife facilities. Communities where the audits were completed include Inuvik, Norman Wells, Fort MacPherson, Fort Resolution, Fort Providence, Fort Liard, Fort Smith, Fort Good Hope, Wekweètì, Łutselk'e and Yellowknife. New projects are currently underway or requested in Yellowknife, Fort Simpson, Nahanni Butte and possibly Fort Smith.

The Northwest Territories Power Corporation (NTPC) also provides building audits for its commercial customers.

Outcomes

- A total of 20 Commercial Energy Audits will be completed in 2007/2008.

Greenhouse Gas Reduction Potential

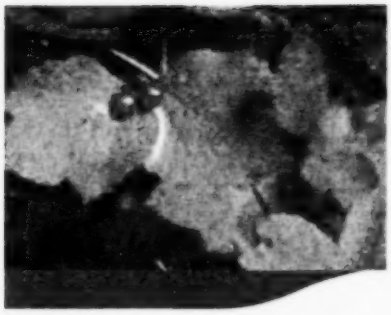
- It is not possible to quantify the greenhouse gas reductions that may have resulted from the audits, as AEA does not do follow-up monitoring.
- Typically an energy audit will recommend energy savings in the range of 10% to 20% of total building energy use.

Implementation

- AEA conducts commercial energy audits for a fee based on the building footprint.
- AEA will assist private firms develop the ability to perform commercial energy audits.

Linkages

- Public Works and Services (PWS) conducts audits on government buildings.



Action #7 Support Industry Energy Efficiency Activities

Description

The industrial sector in the NWT is dominated by the mining, oil and gas sectors. These industries have been consistently making efficiencies in energy usage – principally to save money, but also to respond to environmental concerns, including climate change. Industries such as BHP Billiton's Ekati Diamond Mine have adopted targets to reduce diesel fuel use and have been very successful in their endeavour. Over 3,000,000 litres of diesel fuel have been saved up to 2006 through the BHP Energy Smart Program.

The industrial sector is in a period of growth, with significant potential expansion from the Mackenzie Gas Project and new diamond mines. This growth will increase total greenhouse gases from this sector, but there is considerable room to make efficiencies in production to reduce emissions.

The GNWT helps industry meet its goals of energy efficiency through a variety of programs (such as the commercial energy efficiency program and support of AEA). The majority of industrial production lies outside territorial jurisdiction (the federal government controls most of the land and surface and subsurface rights to land in the NWT).

Greenhouse Gas Reduction Potential

- Industry in the NWT produces over half of all greenhouse gas emissions.
- The federal government is currently in the process of deciding how to regulate large industrial emitters.

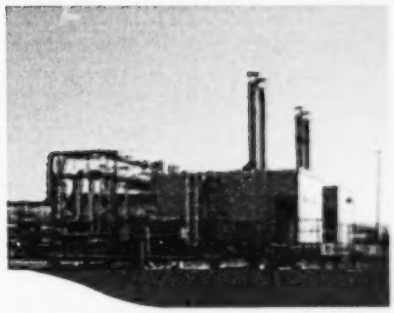
Implementation

- Encourage the use of renewable energy, such as hydroelectric, wind, better use of energy conservation and efficiency technologies, and reduction of transportation fuel use.

Linkages

- The Commercial Energy Efficiency Program provides industry with an audit service for industrial building energy efficiency.
- Hydro-electricity from the Taltson River site can be provided to the four diamond mines.
- Federal regulatory decisions will affect industrial emitters in the NWT.

Action #8 Air Quality and Emissions Management Code of Practices for the Upstream Oil and Gas Industry in the NWT



Description

The current regulatory framework in the NWT consists of interwoven jurisdictions among federal, territorial and regional government agencies. Responsibilities for air quality and emissions management are not well defined.

The National Energy Board (NEB) is responsible for regulating petroleum activities under federal jurisdiction through the *NEB Act* and the *Canadian Oil and Gas Operations Act* (COGOA). While not currently conducting direct management and enforcement activities across much of the NWT, the GNWT does have an interest in ensuring protection of air quality throughout the territory. The GNWT seeks to achieve this by providing advice and recommendations to federal regulatory agencies and other interested parties. The development of the Air Quality and Emissions Management Code of practice (AQEM Code) represents a continuation of this approach and provides a statement of the GNWT's expectations for the management of air quality and emissions from the upstream oil and gas industry in the NWT.

The AQEM Code of practice sets out the specific guidelines, performance standards, best management practices (BMPs), monitoring requirements and best available control technologies (BACTs) to be applied in the NWT to manage atmospheric emissions by the upstream oil and gas industry. This includes all relevant air quality objectives and standards that the NWT already has in place, and is supplemented with relevant guidance and requirements that have proven effective in other jurisdictions and are consistent with the objectives of this Code, as well as some new elements. The supplemental elements have largely been adapted from the prevailing requirements in Alberta, particularly those developed by the Alberta Energy and Utility Board (AEUB) and the Canadian Association of Petroleum Producers (CAPP).

Outcome

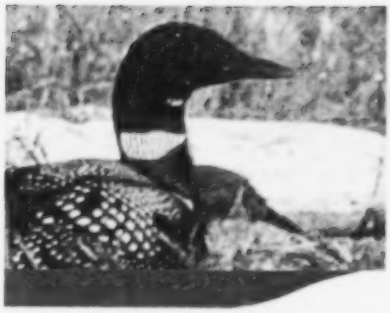
- Effective management of both criteria air contaminants and greenhouse gas emissions from the upstream oil and gas industry in the NWT through implementation of:
  - best available technology and best management practices;
  - science-based standards, coupled with effective monitoring and enforcement, and the balanced application of both prescriptive and performance based regulatory approaches; and
  - a multi-pollutant approach to ensure management decisions consider all atmospheric emissions.

Greenhouse Gas Reduction Potential

- In most situations, measures (e.g. fuel efficiencies) to minimize emissions of common air contaminants will have the co-benefits of also reducing greenhouse gases. Where this is not the case, the relative merits of reductions of each emission category will be considered to reach a balanced decision.

Implementation

- The AQEM Code of practice will be used by ENR in its review and assessment of NWT oil and gas development applications and to communicate to the applicable federal regulatory authorities the GNWT's expectations for the management of air quality and emissions from the upstream oil and gas industry.



Action #9 NTPC Emissions Reduction Initiative

Description

NTPC is the primary power producer in the NWT, operating 31 power plants to meet a total electrical load of 65 megawatts (MW). NTPC's facilities include hydroelectric, diesel and natural gas generating plants, as well as transmission systems and isolated electrical distribution systems. NTPC provides power directly to customers in 27 communities and provides wholesale power to other utilities serving customers in the Yellowknife and Hay River areas.

NTPC has been very successful in reducing emissions from its operations. In 2004/2005, NTPC produced 66 kilotonnes of greenhouse gases, which represented a decrease of 44% from 1990/1991 levels (baseline).

Ongoing actions to further reduce greenhouse gas emissions include:

- increasing the use of available technologies and more fuel efficient diesel gensets to improve plant efficiencies and reduce electricity consumption within its own facilities;
- pursuing additional hydro and natural gas generation opportunities;
- monitoring and researching the development of alternate power generation technologies such as wind, solar power and fuel cells;
- encouraging energy conservation through customer education programs; and
- providing commercial energy audits.

Outcome/Targets

- Forecast hydro generation, which is based on a long-term average water level forecast, has a large influence on NTPC's forecast emissions. Based on its hydro generation forecast to 2010/2011 (including the addition of the Bluefish generation capacity) and its greenhouse gas reduction measures, NTPC expects its emissions over this period to be approximately 60 kilotonnes per year. A reduction of 6 kilotonnes before the next emissions inventory in 2011.

Linkages

- NTPC's emission reduction initiative is linked to hydroelectric development, mini-hydroelectric development, wind resource monitoring and photovoltaics.

Action #10 Hybrid Vehicle Testing

Description

A hybrid car is a vehicle that uses a combination of at least two different fuel sources for propulsion. Although many combinations are possible, generally hybrid cars use a combination of a gasoline internal combustion engine, an electric motor and a battery bank that powers the electric motor and stores energy for future use. Hybrid cars may also be called gas-electric hybrids.

The first commercially available hybrid was the Toyota Prius, which achieves a fuel economy of about 4.5 litres per 100 km in the city. This essentially doubles the fuel economy of an equivalent gasoline vehicle; consequently, it reduces the associated tailpipe emissions by half. The vehicle employs regenerative braking technology that uses the car's own motion to re-charge the battery, making the vehicle partially self-charging. The vehicle also has important new features such as the idle stop, which allows the vehicle to save fuel by not idling when motionless.

Extensive cold weather testing of Toyota's Prius has been carried out by Manitoba's Department of Transportation (DOT) with favourable results. The climate of the NWT, however, is harsher and requires local real world testing to determine if hybrid vehicles are practical here. DOT, ENR and Parks Canada have recently acquired hybrid vehicles for testing.

Outcome

- Hybrid vehicles are more costly than cars of comparable size, however, the fuel savings recoup that cost well within the lifetime of the vehicle.
- Reduced exhaust emissions by up to 90%.
- The quiet electric motor in hybrid vehicles also reduces noise pollution in urban settings.

Greenhouse Gas Reduction Potential

- If 10% of vehicles in the NWT were replaced by mid-sized hybrids, emissions would be reduced by 5.7 kilotonnes per year.

Implementation

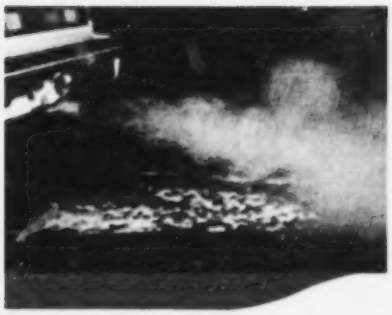
DOT Hay River – GMC Sierra Hybrid Truck
Purchased in March 2006, the fleet manager reports that the truck is operating well and is exceeding fuel economy expectations at the beginning of its first winter test. The DOT in Yellowknife is also testing a Smart Car (which is not a hybrid, but whose fuel efficiency exceeds that of most hybrids).

Parks Canada Inuvik – Toyota Prius Hybrid
Purchased in 2003, park officials report that the vehicle has been a reliable source of transportation. Reliable winter operation is possible, however, they report that the vehicle must be parked in a heated garage or plugged in when not in use.

ENR Inuvik – Toyota Highlander Hybrid
Leased in 2006, ENR officials report the vehicle has experienced no problems and is proving to be suitable for the Inuvik climate.

Linkages

- The use of hybrid and/or other fuel-efficient vehicles is integral to CEP.
- Driver Training and Information Programs



Action #11 Department of Transportation Energy Saving Initiatives

Description

DOT is a large consumer of energy within the GNWT, through the operation and maintenance of the territorial system of airports, highways and ferries. Transportation infrastructure includes:

- 27 airports – 6 class A airports in the larger communities and 21 smaller community airports;
- approximately 2,200 kilometres of public all-weather highway and approximately 1,400 kilometres of winter seasonal roads and eight highway maintenance centres;
- five public ferries operating on NWT rivers, each of which has self-contained crew quarters, storage and repair facilities;
- a centralized warehouse and major repair facility for the department's equipment fleet located in Hay River; and
- three highway inspections stations/weigh scales servicing each of the inter-provincial/territorial highways.

DOT is committed to developing an environmental strategy with accompanying action plan that in part will set the framework for the department's approach to energy conservation and greenhouse gas emission reduction initiatives. The strategy will act as a guide for both individual employees and the Department as a whole, at the regional and corporate level, within and outside the Department. The strategy will be consistent with the GNWT's Sustainable Development Policy and the Vehicle Use – Energy Conservation Policy.

DOT will implement an on-going program of energy conservation initiatives in the following areas:

Buildings: Continue to perform energy audits on the facilities to determine and define specific cost saving, energy reducing initiatives and to assess the viability of using alternate renewable energy sources that can produce measurable tangible results for the Department.

Vehicle Usage: In compliance with the GNWT Vehicle Usage – Energy Conservation Policy, strengthen existing inspection and maintenance schedules, improve monitoring and educate staff to decrease fuel consumption and encourage fuel-efficient driving practices, especially winter driving practices.

Intelligent Transportation Systems (ITS): Encompassing a broad range of wireless and wire line communications-based information and electronics technologies, to better inform the travelling public to avoid unnecessary travel and improve the efficiency of commercial trucking.

Technological Innovation: To investigate and introduce new technologies such as hybrid vehicles, the replacement of main propulsion engines for the MV Louis Cardinal ferry, and the installation and testing of auxiliary heaters to warm vehicle interiors to reduce idling.

Outcome

With the introduction of the environmental strategy and measures to conserve energy consumption, DOT expects to:

- meet the 10% greenhouse gas emission reduction target as a department by 2011;
- foster a culture of conservation within the department;
- develop measures to monitor and evaluate energy saving initiatives; and
- set an example for the transportation industry.

Greenhouse Gas Reduction Potential

- There are significant opportunities for DOT to reduce greenhouse gas emissions within the department and in the transportation industry as a whole.

Linkages

- Hybrid vehicle testing
- Government energy efficiency audits

Action #12 Energy Performance in Government Buildings

Description

The GNWT holds considerable assets in the form of existing buildings. Many of these buildings are aging and have opportunities for further financially viable energy efficiency retrofits. PWS owns and operates many government buildings, although each department pays for the energy and other utilities in the buildings they occupy.

PWS has initiated a new program to Thermoscan, and inspect the electrical and mechanical systems for energy efficiency of all their building assets and provide easily understood energy audits for each building.

Thermoscan technology uses an infrared camera to produce false colour images based on temperature variation. The picture produced is a simple visual illustration of heat loss in a building.

NWTHC has purchased one of these cameras as well and will be conducting a similar program on some of their public housing units.

Outcome

- PWS will make audit results available to the tenants of each building and department heads. More detailed audits will be prioritized based on problems found in buildings and renovations will be completed based on energy savings and projected payback.
- PWS will establish a new Asset Management Energy Specialist to facilitate and encourage energy efficiency activities and improvements within government buildings

Greenhouse Gas Reduction Potential

- Improving energy efficiency in buildings is a simple way to achieve a reduction in fuel use and emissions. Audits can often identify significant inefficiencies, and recommend methods to solve them. This program should help to encourage departments and employees to target priority energy problem areas in buildings.

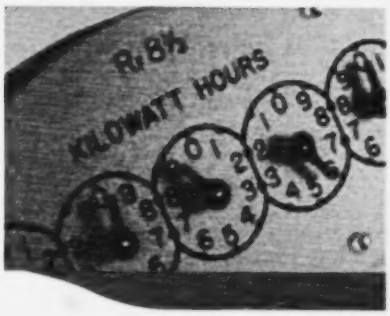
Implementation

- Complete energy audits on 25 buildings with the greatest potential for energy and cost-saving benefits by 2008. By 2009 complete 350 thermal scans on GNWT buildings.

Linkages

- Energy efficiency codes

Action #13 Utility Tracking System



Description

The Financial Management Board Secretariat (FMBS), in association with PWS, created a utility tracking system to track electricity and fuel use in government departments. This project was initiated in 2001 to fill a gap in utility reporting for energy related projects and to help track energy efficiency.

Outcome

- The utility tracking system was created to track expenditures.

Greenhouse Gas Reduction Potential

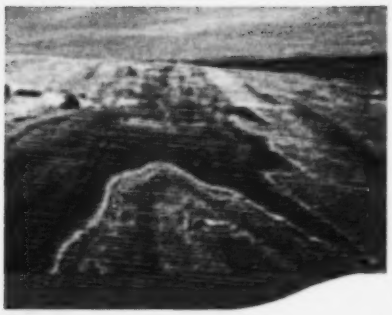
- The system will be improved to help track the government's greenhouse gas emissions.

Implementation

- PWS initiated the program and FMBS is tasked with maintaining the database.

Linkages

- The utility tracking system will assist developing emission inventories.
- The database can be used to assess and rate determine energy performance of existing buildings.



Action #14 Energy Performance in New Facilities

Description

PWS has responsibility for constructing new GNWT facilities. The department has been proactive with regards to energy efficiency. It is realized that new buildings will be around for at least 30 years and the accumulated operating costs are a significant portion of the total building cost.

All new buildings are built according to *"The NWT Good Building Practice for Northern Facilities 2000"* that PWS has developed. A new edition is being prepared to take into account new technologies and updated building practices which will lead to more efficient facilities.

The Good Building Practice uses the *Model National Energy Code for Buildings* (MNECB) as the performance standard. The *Leadership in Energy and Environmental Design* (LEED™) is another performance standard that uses an extensive project evaluation checklist to audit an integrated design and construction process. Implementing the checklist activities leads to better balance between minimum energy consumption, minimum environmental impact, and operational sustainability over the life of the building, minimizing the total cost of ownership (also called the life-cycle cost).

MNECB is currently being used as the GNWT standard for new large government buildings constructed in the NWT. Executive Council approval of funding requests for new facilities requires that they be designed to demonstrate a reduction in energy use that is at least 25% lower than the recommended MNECB standard.

Outcome

- GNWT currently has five buildings which are being built in 2006/2007 based on the MNECB Standard.
- Analysis by PWS has shown that buildings recently built based on the NWT Good Building Practice have met MNECB requirements. Energy and cost savings from new buildings justify the energy efficiency provisions.
- The Good Building Practice will be revised to incorporate new technologies and updated building practices in 2008.
- Best practices in building envelope design will be reflected in new public housing design practices in 2008.

Greenhouse Gas Reduction Potential

- Because these buildings are new it is impossible to quantify the cost savings and greenhouse gas savings.

Implementation

- PWS
- The additional costs of building to meet the NWT Good Building Practice are met by operating cost savings over the long-term occupancy of the building.
- Energy efficient building practices have been getting more stringent in the past five years and it is likely that this will continue into the foreseeable future.

Linkages

- PWS constructs new buildings for GNWT departments. Therefore, their building practices directly affect the operating costs, in particular the energy costs of different departments.
- Model National Energy Codes for Buildings

Action #15 Green Procurement Policy

Description

The GNWT has had a green procurement guide in place since 2002. This guide is designed to encourage all departments to purchase environmentally friendly products. The objectives of the guide are to:

- provide an environmental role model for public and private sectors;
- increase demand for environmentally responsible products and services; and
- conserve resources.

The guide states that "the Government of NWT will acquire goods and services that are environmentally responsible or less environmentally harmful than those used currently. Green products are those that reduce waste, improve energy efficiency, reduce toxic by-products, contain recycled content or are reusable." The guide also says that departments should look at new green products on a trial basis until technical and performance requirements have been proven. The GNWT will give preference, when economically feasible, to environmental products and services that are compatible with an individual department's requirements.

The guide will be updated to reflect new goods, services and practices, including:

- contract services – construction and maintenance;
- tendering – should involve consideration of the environment over the lifecycle of a product; and
- resources – manufacturers and suppliers with products certified under the Environmental Choice Program or products labelled under a relevant environmental labelling program will be selected when they meet performance and technical standards.

Outcome

- This guide is currently applicable across all GNWT departments.
- This is currently a guide. In the future this will become policy.

Greenhouse Gas Reduction Potential

- The GNWT buys large amounts of materials and services. A policy which encourages green procurement has the potential to offset greenhouse gases.
- This increase in green procurement would also create a larger market in the NWT for green products and create economies of scale for green products.

Implementation

- FMBS

Linkages

- The Green Procurement Policy is used by all GNWT departments.

Action #16 Electrification of Heat Loads

Description

The South Slave community of Fort Smith is tied into the Taltson River hydroelectric grid. The hydro potential of the Taltson is not being utilized to its full potential. PWS and the NTPC have been working together on a project to convert three buildings to electric heating in Fort Smith to use the available excess power. The Thebacha Campus Records Storage Warehouse, Breynat Hall and JBT Elementary School will be converted.

Outcome

- Three buildings will be converted to electric heat in the first phase of the project.
- Payback on this type of investments depends on future fuel prices, as well as pricing for the electricity.
- Cost savings of $200,000 per year for five years to be realized starting in 2008/2009, with savings reinvested in energy-saving projects.

Greenhouse Gas Reduction Potential

- Because hydroelectric power produces no greenhouse gases, the offset emissions from the conversion will be 800 tonnes of CO_2 per year.

Implementation

- PWS and NTPC are currently working on three buildings in the first of a two phase project toward electrification of heat load.

Linkages

- There is a linkage with an initiative to convert part of Thebacha College in Fort Smith to a ground source heat pump using electricity from the Taltson system.
- Mini-hydroelectric developments in other communities could be sized to allow electrification of heat loads.

Action #17 Forest Management

Description

The Kyoto Protocol Article 3.3 is a mandatory provision for all signatories. This article requires accounting for all acts of deforestation during the reporting period.

The Protocol Article 3.4 is an optional provision pertaining to the inclusion of forest management activities by the signatory. Canada must decide in 2007 whether it will adopt this Article. If the Government of Canada adopts Article 3.4, all jurisdictions will be required to report on the carbon balance accounting pursuant to the area of forest defined as that of a managed forest.

Outcomes

- The forests of the NWT have been assessed to determine their role in the carbon balance. This recently completed work will be added to results from all jurisdictions in Canada to help the Canadian Council of Forest Ministers to decide on whether to count Canadian forests in national emission inventories. This will determine whether NWT can count storage of CO_2 in our forests as a carbon sink.

Greenhouse Gas Reduction Potential

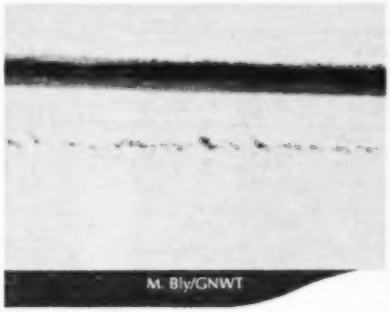
- Minimizing areas reported under Article 3.3 will reduce the carbon sequestration losses associated with deforestation.
- Management practices in defined 'managed forests' can minimize carbon emissions and maximize forest growth to optimize terrestrial carbon sequestration numbers for the forest lands within the NWT.

Implementation

- Forest Management Division of ENR

Linkages

- National Forest Sinks Programs under the Canadian Council of Forest Ministers. Specifically those pertaining to the management committee and the Carbon Balance Modelling of the Canadian Forest Service.
- Baseline information on forest vegetation in the NWT and the accurate assessment of annual change.
- The sharing of land use data between the federal management agency (INAC), the land and water boards of the NWT, and the GNWT. A committee has been struck (Land Use Data Sharing Committee) that has objectives consistent with the needs of this action.



M. Bly/GNWT

Action #18 Residual Heat Recovery

Description

NTPC sells residual heat from diesel generation of electricity in several communities. Approximately one-third of the energy in heating oil is converted into electricity from diesel generation. Another one-third of the energy is lost to the air as flue gas emissions, which include greenhouse gases. The final third of the energy is either discharged into cooling waters or can be captured to heat nearby buildings.

NTPC uses residual heat captured from diesel generators to heat its own facilities, but there is a great deal of energy lost, which could be used to heat nearby buildings. Residual heat recovery systems have been installed in several communities to transfer this heat to nearby buildings.

The major barrier to the expansion of residual heat recovery is economic; installing and maintaining the necessary infrastructure is expensive. The desires of many communities to eventually move the diesel plants outside of the communities also works against the implementation of residual heat recovery, as the diesel generator must remain in close proximity to the buildings that use this heat.

Outcome

- Results have been mixed and there have been no new residual heat systems installed in recent years. There are systems in place in Fort McPherson and Whati.
- It is an advantage that the highest heating needs occur in the winter season when demands for electricity are also highest, but in these systems heat availability depends on the electricity load on the system, making the heat undependable at times.
- NTPC is evaluating further opportunities to make economic use of these systems in other communities.

Greenhouse Gas Reduction Potential

- While there are some losses in moving the heat, residual heat recovery can offset a large portion of the greenhouse gas emissions that would have been emitted by the avoided heating fuel. There is a potential, if residual heat recovery were to expand significantly, to offset a large portion of the commercial and institutional space heating requirements in some communities.

Implementation

- These projects have a cost recovery aspect that is not sufficient to make these projects self-financing business deals.

Action #19 Combined Heat and Power

Description

Combined heat and power (CHP) is sometimes referred to as co-generation. It is a new technology that provides more efficient use of fuel by the simultaneous production of electricity and useable heat. Although similar in concept to residual heat recovery, CHP units are designed to provide heat at the location where it is produced. CHP modules are marketed as microturbines, which are approximately the size of a refrigerator, with outputs of 25-500 kW.

CHP microturbines offer a number of potential advantages over other technologies for small to medium-scale power generation, including greater efficiency, lower emissions and potentially lower electricity costs. They can be located on sites with space limitations for the production of power. When matched to follow a continuous heat load they can achieve efficiencies of more than 80%.

CHP is an emerging technology. Commercial units are available that run on natural gas, but oil fired units are still being developed. Their compact size, relatively low costs, and low operation and maintenance costs could enable microturbines to become common in the NWT in coming years.

Outcome

- One microturbine system replaces two conventional systems (i.e. a boiler for heat and a diesel generator for electricity) resulting in a significant increase in efficiency.

Greenhouse Gas Reduction Potential

- CHPs have the potential to be 40% to 50% more efficient than using boilers and generators. Greenhouse gas reductions will be on a similar scale.

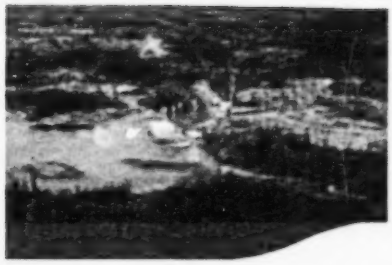
Implementation

- Since 2002, NTPC has been testing two natural gas microturbine CHP units at the Inuvik Recreational Complex. Each unit produces 28 kW of power, 60 kW of heat output and are grid-connected.
- Expected peak total system efficiency: 78%, actual total system efficiency: (21% electrical + 45% thermal) = 66%

Linkages

- Distributed Generation Guidelines

Action #20 Hydroelectric Development



Description

The NWT Energy Corporation (NTEC), a wholly-owned subsidiary of NTPC, was created in 2003, to identify and develop the hydroelectric resources of the NWT, in partnership with those Aboriginal governments expressing an interest in developing such resources.

NTEC is evaluating two major new hydroelectric projects. One is the development of the hydroelectric potential on the Great Bear River. This project is currently in the pre-feasibility stage, however, all work is on hold until markets for power related to the Mackenzie Gas Project are confirmed.

NTEC's second project, which is nearing the end of the feasibility stage, involves the expansion of the hydroelectric potential on the Taltson River. The Taltson Hydro Expansion Project proposes to design and install 36 megawatt (MW) of new generating capacity into the existing hydroelectric generating plant at Twin Gorges on the Taltson River (approximately 60 km NE of Fort Smith, NWT). This new capacity, in conjunction with a surplus of approximately 10 MW available from the existing plant, would provide hydro power to the NWT's diamond mining sector. The cost of constructing a 600 km transmission line to the mines will be significant.

Outcome/Targets

- At present, the NWT has two operating diamond mines (Ekati and Diavik), a third mine under construction (Snap Lake) and a fourth in the regulatory process (Gahcho Kué). All of the mines use diesel to meet their electrical and space heating requirements. Total electrical generation from Ekati and Diavik currently releases about 150 to 160 kilotonnes of emissions annually (8% of the NWT total). Once Snap Lake and Gahcho Kué are in production, annual diesel fuel consumption for electrical and space heating for all mines could exceed 100 million litres, which would result in annual greenhouse gas emissions of 300 kilotonnes or more starting in 2011

Implementation

- The next steps for the Taltson project, which is being developed through a joint partnership involving NTEC, the Akaitcho Territory Government and the NWT Metis Nation involve ongoing project definition and development, including the preparation of environmental assessments and permitting applications. A comprehensive Hydro Strategy will be completed by November 2007. Construction on the proposed Taltson expansion will commence in September 2008, depending upon the environmental assessment process.

Action #21 Mini-Hydroelectric Development

Description

Hydroelectric development in the North has traditionally been built to provide power for mine operations. When the mines closed, the hydro generation capacity was sold to NTPC and used for urban needs. Hydroelectricity from this legacy now supplies the communities of Yellowknife, Hay River, Fort Resolution, Detah, Behchokǫ̀ and Fort Smith.

In recent years several communities have looked to local water resources and the potential for run of the river mini-hydro. These systems avoid the environmental problems that are often caused by hydro developments because they have no reservoir and do not dam a river. Some of the flow in the river is diverted through a pipe down a natural grade (around a waterfall or rapid) to a small turbine plant and then returned to the river. Mini-hydro typically only uses a portion of the water from a river, depending on the electricity demand. Mini-hydro developments are considered the most environmentally friendly form of hydroelectricity.

This technology is expensive and the small economies of scale involved make it difficult to acquire the necessary capital funds. The benefits for the community include control over power production decisions, lower future electricity costs, and reduction of pollution and greenhouse gases. Mini-hydroelectricity also provides the opportunity for heat load electrification that could provide further emission reductions.

Outcome

- Whatì, Łutselk'e, Kakisa and Gamètì are evaluating the potential of mini-hydro production for their communities.

Greenhouse Gas Reduction Potential

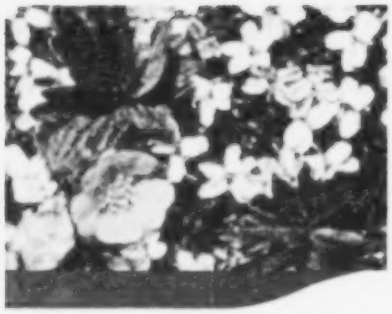
- There is the potential in the community of Whatì to reduce diesel fuel use by 187,000 litres and greenhouse gas production by 2 to 2.5 kilotonnes of CO_{2e} annually (Whatì Mini-Hydro Economic Feasibility Study).

Implementation

- These projects are still in the feasibility stage, business plans would need to be prepared and investment funds identified before they could proceed.

Linkages

- AEA
- CEP
- Heat load electrification



Action #22 Wind Energy Development

Description

ENR is working in a partnership with Industry, Tourism and Investment (ITI), INAC, NTPC, AEA and the ARI to assess wind resources in the NWT and establish a plan of action to develop wind power in the NWT. This partnership was started by the Energy Secretariat in 2003.

Wind resource monitoring is centred on a study by ARI to assess wind energy potential in the Beaufort communities ("Pre-feasibility Analysis of Wind Energy for Inuvialuit Region in Northwest Territories", ARI, March 2003). This report recommended measuring the wind resource in four Beaufort Sea communities (Ulukhaktok, Sachs Harbour, Tuktoyaktuk and Paulatuk) to collect sufficient data to enable a feasibility and business case analysis. Wind anemometers have been set up in each of these four communities.

Building upon this project, further wind monitoring has been initiated in Inuvik and, most recently, in Yellowknife. Two years data is generally required to assess the wind resource in a location. The monitoring units may be moved to different communities for further assessment of potential wind power.

Wind monitoring data will be available in 2007, and the next step in the process of wind development will be feasibility assessments and economic analysis.

Outcome

- Expansion of wind monitoring to three communities by 2008. Detailed business case developed and site chosen for an operating turbine in 2008. An operating wind turbine by 2009.
- A small to medium sized pilot project wind installation in a location easily accessible to build capacity and provide training potential for northern staff.
- If this project is successful, future installations of wind turbines can be added where wind monitoring has indicated that resources are available.

Greenhouse Gas Reduction Potential

- With a total of 10 turbines and 660 kW capacity installed, a community in Alaska offset approximately 341,000 litres of diesel. A reduction total of 930 kilotonnes annually.
- The greenhouse gas potential is dependent upon the size of the turbine, the wind resource, as well as the type of fuel the wind offsets.
- There is a considerable wind resource in the NWT, although it is tempered by the small size of communities and the ability of wind to harmonize with diesel generators.
- It is expected that greenhouse gas reduction will be small at first with the potential for long-term reductions.

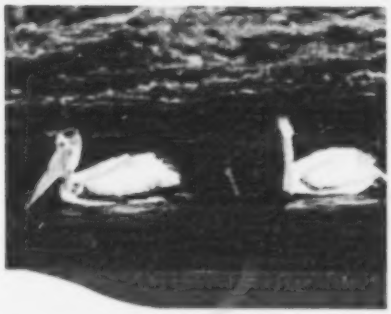
Implementation

- The monitoring project has been implemented for several years and will continue to expand in the near future.
- There is considerable community interest in this project.

Linkages

- Diavik and BHPB also have private wind monitoring programs and are currently assessing the potential of wind to offset diesel generation.
- Distributed Generation Guidelines

Action #23 Ground Source Heat Pumps



Description

Ground Source Heat Pumps (GSHPs) are a low grade source of geothermal heat. They remove heat from the ground and circulate it into a building. GSHPs are a successful and widely used technology in many areas of southern Canada. They return approximately three times the heat as the amount of electricity they use to operate a circulation pump. The efficiency of GSHPs depends on substrate, depth and local ground temperatures. Several pilot projects are underway to determine the feasibility of these systems in the NWT.

GSHPs follow the same principles as a radiator system in a vehicle. Heat is removed from the engine within a liquid and is transferred to the radiator where the heat is released from the liquid into the environment. In a similar way GSHPs transfer natural heat from the earth into a building environment through a liquid that is circulated, in a closed loop, from ground to surface. The liquid in the pipes absorb underground heat energy which is pumped to the building where it is used to preheat cold air or water, thus significantly reducing the cost of heating.

The cost of drilling in bedrock increases costs and, therefore, payback time. The high costs of electricity and the equipment needed are other limiting factors for this technology in the NWT. The payback period is reduced somewhat if GSHPs are incorporated in new building construction.

Outcome

- Despite higher electricity prices in the NWT, lower annual heating costs could result from GSHP systems in both commercial and residential applications. These costs are being evaluated by the Arctic Energy Alliance.

Greenhouse Gas Reduction Potential

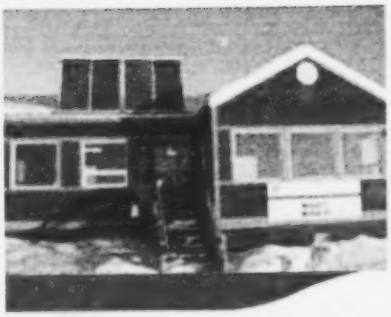
- A model residential system in the NWT is estimated to have an annual emission reduction potential 9 tonnes.
- A model commercial system in the NWT is estimated to have an annual emission reduction potential of 209 tonnes.

Implementation

- Part of the Thebacha College in Fort Smith is to be connected to a GSHP, using electricity from the Taltson system hydroelectric grid. The project infrastructure is partially completed.
- Two privately funded residential systems being installed in Yellowknife will be monitored by the AEA.
- The City of Yellowknife CEP has identified the potential for using large-scale GSHP technology to harness heat from 30°C water from deep mine shafts below Yellowknife.

Linkages

- Electrification of heating loads in combination with GSHPs would further increase efficiency. Hydro communities with excess hydroelectric power could invest in this technology.



Action #24 Photovoltaics

Description

Solar photovoltaic panels (PV) transform solar radiation into electrical energy using a thin layer of silicon based cells spread on a panel. This technology has been used for decades, first developed to provide electricity for spaceships and later to provide electricity in niche markets. The latest PV panels can be integrated into building materials such as roofing and windows.

Although the cost per watt of energy is still high, solar panels are extremely dependable, with a long lifespan. Prices have been coming down for years and solar panels are now widely used all around the world. In the NWT, PV use is generally for niche applications, although several larger arrays have been placed on northern buildings.

Experience in the NWT has demonstrated that PV is reliable and effective in the North. A northern problem for PV technology is the seasonal availability of the sun. Long dark nights in the fall and winter give way to abundant sunlight in the spring and summer. This seasonal disruption in availability can make PV a challenge to integrate with existing power systems.

Outcome

- PV systems tied into battery banks can significantly reduce the amount of fuel used in generators for off-grid applications, thus reducing greenhouse gas emissions. These hybrid systems are simple to install and cheaper to operate than diesel only systems.
- PV connection into community grid systems is still more expensive than conventional electricity sources. PV costs are coming down and they will likely be a more cost competitive source of electricity in a few years.
- Pilot projects have been introduced to connect PV into community power grids to help determine the value of the power produced and to gain experience in technical considerations of introducing these small-scale sources of distributed electricity generation into grids.

Greenhouse Gas Reduction Potential

- PV pilot projects funded through the Renewable Energy Technology Conversion Assistance Program (RETCAP) from 2001 to 2003 led to a reduction of 439 tonnes of CO_2 per year.

Implementation

NTPC Headquarters, Hay River
A PV demonstration is installed on the roof of the NTPC office in Hay River. This 1 kW array is tied to the grid, which eliminates the need for battery storage. Instead, an inverter converts DC to AC, which is used directly within the building. Since all available production is used, there is no excess power fed back into the grid.

Sir John Franklin High School, Yellowknife
A 2 kW grid-tied solar PV demonstration was installed on the roof of the school in 2003. Like the Hay River installation, the electricity produced is supplementary to the energy needs of this large facility and no excess power is fed back into the grid.

The main goals of this project were educational in nature. With guidance from a project manager and the Arctic Energy Alliance, students and teachers maintain the infrastructure and analyse data.

Aurora Research Institute, Inuvik Office
A 1.4 kW grid-tied solar PV demonstration was installed as part of a wind hybrid system. The energy produced supplements the Aurora College Building power needs.

Greenstone Building, Yellowknife
The south-facing PV curtain wall of the Greenstone Building contains the highest proportion of PV power supplied within a Canadian public building. The PV-integrated window panels have the potential to supply 31,300 kWh of electricity, meeting up to 20% of the building's electrical consumption.

After the first year of operation, data indicates that approximately 15,000 kWh of electricity were produced. Electrical problems with several sets of solar panels reduced electrical output of the PV curtain wall.

Multi-purpose Hall, Jean Marie River
A 1.32 kW grid-tied (PV) solar array was installed in 2005. Data is being collected and compiled by the Arctic Energy Alliance. A preliminary RETScreen analysis indicated that the system would provide 1.386 MWh of energy, 1.24 tonne reduction of CO_2 emissions, $1.708 in annual savings and a simple payback period of approximately 16.5 years.

RETCAP
Starting in April of 2001, off grid home-owners, houseboaters and remote lodge operators installed 36 renewable energy systems during a two year period, when funding was available through this program. RETCAP demonstrated that in the NWT, renewable energy systems are economical and dependable sources of electricity for year round dwellings that are not connected to community electricity grids. Users found that hybrid wind and/or solar energy systems, backed up with conventional generators, are dependable, easy to use and affordable. Through fuel savings, the collective cost of all the installed systems had an estimated four to five year paid back period.

Linkages

- AEA, ARI
- PV lends itself to other technologies, including GSHPs and wind/solar hybrid systems.
- Distributed Generation Guidelines

Action #25 Solar Hot Water Heating

Description

ENR and the Energy Secretariat partially funded a number of solar domestic hot water heaters. These systems absorb heat from the sun in enclosed solar collector panels; the heat is transferred through a heat exchanger and stored in an auxiliary hot water tank. This pre-heated water feeds into the standard hot water heater for the household water system. A solar hot water system can offset over 50% of annual hot water heating costs.

The technology is relatively simple and robust, and is effective in northern climates, as the North receives a significant amount of sun during part of the year. ENR and AEA are currently running a monitoring program to determine the amount of energy that can be captured versus the cost of the systems. This monitoring is being conducted to determine the economic potential for solar domestic hot water heating in the NWT.

NWTHC is particularly interested in this technology and has ordered and/or installed 11 panels in various communities for testing. Hot water heaters are a significant user of electricity and/or fossil fuels, and the solar heaters may provide an environmentally friendly solution to the high costs of water heating.

Outcome

- There are currently 17 solar hot water panels in the NWT, on 14 buildings.
- Nine communities throughout the NWT have pilot installations of panels for the evaluation of this technology.
- Solar heating systems are available for outdoor swimming pools.

Greenhouse Gas Reduction Potential

- Monitoring is currently underway to determine the amount of fossil fuels that solar hot water heaters can displace in a year.

Implementation

- NWTHC installed most of the solar hot water heaters currently being tested in the NWT.

Linkages

- AEA is a partner in monitoring of this program.

Action #26 Distributed Generation Guidelines

Description

Distributed Generation (DG), also called Distributed Energy, refers to the generation of electricity (or heat) near the intended place of use, instead of at a large centralized power plant.

In July 2006, a one-day workshop was held with representatives from the GNWT, NTPC, Northlands Utilities and the NWT Public Utility Board (PUB). The main objective of the meeting was to explore the potential role of DG in the NWT energy supply mix and to discuss the idea of developing NWT distributed generation guidelines.

Outcome

- Safety and technical interconnection standards have been developed by NTPC and presented to the PUB for approval.
- Net metering standards, pricing and stand-by charges need to be determined.

Greenhouse Gas Reduction Potential

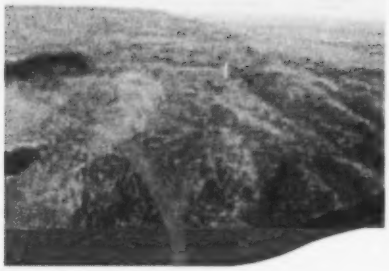
- If DG technologies provide 25% of the annual electricity requirements in the NWT's diesel-electric communities; the resulting greenhouse gas reductions are estimated to be 12.8 kilotonnes per year.

Implementation

- Small DG projects have already been installed in the NWT using PV panels. These small grid-tied projects produce less power than the building consumes, avoiding metering and pricing issues with utility companies.
- Wind turbines, solar photovoltaic panels, and combined heat and power microturbines will require well-established guidelines for smooth implementation.

Linkages

- DG crosses over a wide range of existing actions, including NTPC emission reduction initiatives, combined heat and power, wind power and photovoltaics.



Action #27 Biofuels

Description

Biofuels are renewable fuels made from plants that can be used to supplement or replace petroleum and diesel used for transport. The two main biofuels are ethanol and biodiesel. Ethanol is produced from the fermentation of grains such as corn, barley and wheat. Biodiesel is made from vegetable oils in crops such as canola, soybean or from animal fats.

Cellulosic ethanol is a newer technology which uses waste products such as corn stalks, straw and wood residues. Reductions of greenhouse gases up to 80% can be achieved from cellulose-based technology, while only 40% reductions can be achieved by ethanol and biodiesel. Biofuels, however, have the drawback of using land and fertilizer that could be used to produce food crops.

The federal government announced a plan in May 2006 that would see Canadian gasoline contain on average 5% ethanol by 2010, and diesel contain an average of 2% biodiesel by 2012.

Outcome

- The NWT does not have an agricultural base to support a biofuel production industry.
- There is future potential to use emerging technology in the North to create synthetic gas from trees such as fast growth willows.

Greenhouse Gas Reduction Potential

- If the 40 million litres of gasoline used in the NWT annually contained a 5% mix of ethanol, an emissions reduction of approximately 1.8 kilotonnes would be realized each year.
- If the 134 million litres of diesel used in the NWT annually contained 2% biodiesel, an emissions reduction of approximately 2.9 kilotonnes would be realized each year.

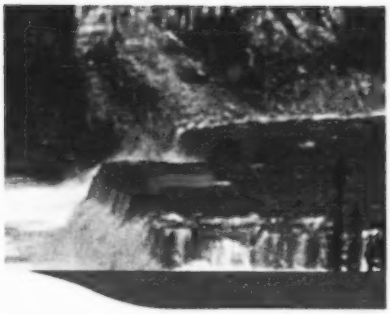
Implementation

- While biofuels should work fine in most modern vehicles, there are still questions about how it runs in smaller two-stroke applications such as snowmobiles, outboard engines, chain saws, etc. Fuels also need to remain stable at cold temperatures if they are stored and used in the NWT. Cold weather testing is currently underway on biodiesel in northern Alberta.
- ITI and ENR are engaged in federal/provincial/territorial discussions about how a national mandated biofuel content would be rolled out.

Linkages

- Biofuels are linked to all aspects of transportation.
- When used in heating applications biofuels link with CEP and Commercial Energy Efficiency Programs.
- NTPC is investigating the use of biofuels for diesel electricity generation.

Action #28 Biomass



Description

PWS and the Department of Justice (Justice) have teamed up to implement a wood pellet boiler pilot project in the NWT Correctional Facility. Taking advantage of a new program provided by Arctic Green Energy, which will supply the boilers at no cost, provided pellets are bought from the company at a cost tied into the price of diesel fuel (this cost is guaranteed to be the same or lower than the equivalent cost of heating fuel).

Two 740 kW wood pellet boilers have been installed to provide 50% of the base heating load of the facility, which is equivalent of up to 90% of the total heating load. This program saves $250,000, the estimated cost for new diesel boilers, and reduces operating costs by an estimated $50,000 per year over the life of the boilers.

This is currently a pilot project, which will be assessed and will be expanded should the results be satisfactory.

Outcome

- Arctic Green Energy is a private company which is currently marketing commercial units in the NWT.
- If the pilot project is successful, future implications for energy and emissions savings are significant.

Greenhouse Gas Reduction Potential

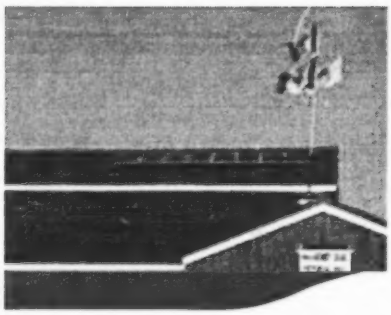
- Wood pellets are a waste product of the forestry industry and are considered to be carbon neutral (assuming forests are regenerated, thus recapturing released CO_2).
- It is estimated that annual greenhouse gas savings at the Correctional Centre building will be 1.5 kilotonnes.

Implementation

- PWS and Justice in cooperation with the private company Arctic Green Energy.
- The boilers were installed in the fall of 2006.

Linkages

- This technology could lead to significant reductions in fossil fuel use and associated operating cost savings for all government departments, as well as for community and private sector buildings.



Action #29 Alternative Energy Technologies Program

Description

ENR is developing a new program to promote alternative energies in the NWT. This program will be available to government departments, non-profit organizations, and community or Aboriginal governments to establish pilot projects. These technologies might include solar photovoltaics, solar hot water heaters, wind energy, biomass, ground source heat pumps, combined heat and power systems, and other energy saving technologies. The purpose of the program is to build a knowledge base and to provide real world testing of these technologies.

Outcome

- Pilot projects in communities will increase ability to learn how to use alternative energy technologies and provide opportunities to test their applicability in northern conditions.

Greenhouse Gas Reduction Potential

- The majority of alternative energy technologies inherently reduce greenhouse gas emissions.

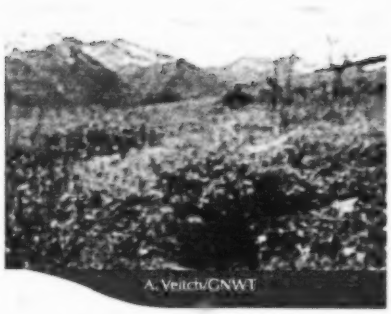
Implementation

- ENR will develop application guidelines and administer funding assistance programs as they become available.

Linkages

- AEA
- CEP
- NTPC
- Distributed Generation Guidelines

Action #30 Energy Conservation Program



Description

ENR administers the Energy Conservation Program (ECP). This program provides funding assistance (up to 50%) for energy conservation projects in territorial, community or non-profit organization operated buildings. Funding must go towards energy saving projects, which have a simple payback of five years.

Retrofits of existing lighting, heating, ventilation, water or electrical systems, installation of renewable energy pilot projects and training have been funded. This program has been in place since the 1980s and has been very successful, particularly in 2005/2006 when energy prices increased substantially, making energy reducing projects a priority in the North.

Outcome

- Many of the projects that ECP funded have led to significant energy savings. Annual savings of over $800,000 have been made from an initial ECP investment of $1.43 million dollars over the past five years.
- Energy savings are spread throughout the NWT and the program has been effective at encouraging many projects in isolated communities.
- Funding to be directed towards community governments and non-government organizations for energy conservation and efficiency improvements that can provide $80,000 per year in savings and reduce greenhouse gas emissions by 200 tonnes per year.

Greenhouse Gas Reduction Potential

- From 2001 to 2006 this program has led to an annual average savings of 1.9 kilotonnes of CO_2.
- Continued support for this program will result in cumulative reductions of approximately 26 kilotonnes by the next emission inventory in 2011.

Implementation

- ENR

Action #31 Driver Training and Information Programs

Description

The GNWT follows guidelines and procedures, outlined in the 'vehicle use code of conduct', that ensure energy conservation in its vehicle fleet. Departments are required to purchase or lease the most fuel-efficient and lightweight models available that will meet their needs. Fuel-efficient driving practices are well established; they include limitations on idling time, the use of plug-in timers, car-pooling and regularly scheduled vehicle maintenance.

Outcome

- Fuel conservation
- Reduced wear and tear on the fleet

Greenhouse Gas Reduction Potential

- Each litre of fuel conserved reduces greenhouse gas emissions by 2.4 kilograms of CO_2.

Implementation

- The GNWT has recently invested in two gas-electric hybrid vehicles and a smart car for testing purposes.
- The GNWT in conjunction with AEA produced a pamphlet called "Six Hot Winter Driving Tips" to address six common myths about cold weather driving.
- Anti-idling programs to discourage excessive idling.
- DOT is preparing a new driving tips pamphlet with AEA.

Linkages

- Hybrid vehicle testing and AEA public awareness programs

Action #32 Active Transportation

Description

Active transportation refers to transportation that produces no greenhouse gas emissions. Walking and cycling are the two most popular forms.

MACA, Sport, Recreation and Youth Division, works with other jurisdictions to promote Active Transportation as part of the Framework for Collaborative Action approved by the National Ministers of Sport, Physical Activity and Recreation. To support this, MACA will include a workshop on active transportation at the April 2007 Strengthening Communities Conference, to ensure that this is seen as a component of Integrated Community Sustainability Plans. Gas Tax Funding can also be used to support active transportation initiatives at the community level.

Outcome

- Provides individual health benefits through regular exercise.
- Reduction of smog emissions results in improved local air quality.
- Monetary savings (fuel and insurance costs).

Greenhouse Gas Reduction Potential

- In Yellowknife a reduction of 200 kilograms of CO_2 per year would be realized for each single occupant commuter who chooses active transportation.

Implementation

- Active transportation is an individual choice that does not lend itself to regulation. Governments, however, can provide certain incentives and disincentives to increase active transport.
- Incentives are generally under the jurisdiction of municipalities and include making improvements and expansion to trail and bike route systems, keeping sidewalks well maintained and plowed, promoting and encouraging commuter challenges, and providing a convenient public transit system
- Disincentives include increasing the cost of downtown parking, closing some streets and/or lanes to vehicle travel, and making pedestrian travel more appealing.

Linkages

- Public Education and Training promoted by AEA
- CEP

Action #33 Energy Conservation Education and Awareness

Description

The introduction of new energy technologies are certain to help reduce greenhouse gas emissions, however, better technology is only a part of the solution. It is well documented that our individual behaviour as energy consumers is the most crucial factor to offset greenhouse gas production. Energy awareness and conservation efforts are accessible to all NWT residents and require no expensive technologies. Public education and training offers the greatest potential when it comes to immediate and affordable greenhouse gas reductions.

The GNWT supports several programs and agencies that share a mandate to promote energy awareness and conservation that ultimately result in reduced emissions. In recent years, higher energy and fuel prices have moved conservation and efficiency efforts towards the mainstream. The public, now more than ever, are looking for ways to cut costs.

Outcome

- Immediate monetary savings for businesses and residents of the NWT.
- Learned behaviour is passed down through generations and within families, resulting in a growing legacy of energy wise citizens.
- Improved energy facts and information will be made available to residents and communities through the AEA web site and other publication materials.

Greenhouse Gas Reduction Potential

- Actual greenhouse gas savings directly or indirectly attributable to public education and training are difficult to calculate.

Implementation

- AEA and ARI are clearinghouses for energy and utility related information in the NWT.
- Groups such as Ecology North promote sustainable living and offer many educational programs regarding energy conservation and greenhouse gas reduction.

Linkages

- Almost all the actions listed in this Strategy are linked directly or indirectly to education and training.

Action #34 Climate Change Education in Schools

Description

The Department of Education, Culture and Employment (ECE) have a number of school-based science curricula (kindergarten through grade 12) that address the topics of resource sustainability and climate change. The kindergarten through grade 6 science curricula includes sections on resource sustainability, conservation and climate change and adaptation. In grades 7 to 10, students investigate renewable and non-renewable energies, innovative technologies and environmental issues, including climate change. Biology 20 investigates environmental issues at the biome level with a focus on climate change. The Chemistry 20 curriculum investigates combustion of carbon fuels and the production of greenhouse gases.

The science technology and society component of all high school science courses requires students to examine the ways science and technology effect society. A new high school science, course called experiential Science 10-20-30 deals, with Terrestrial, Marine and Freshwater system respectively for grades 10, 11 and 12. This new course, particularly at the grade 10 level, provides students with the opportunity to investigate their local environment and how it fits in with the larger picture of climate change. Students taking this course are actively involved in school/community-based investigations. Students will investigate ecological footprints and case studies on resource development and climate change.

Outcome

- Students kindergarten to grade 12 have opportunities to learn about, conservation, sustainability, ecological footprints and climate change.

Greenhouse Gas Reduction Potential

- Students become aware of their ecological footprint as individuals and a society, thereby allowing them to make informed decisions.
- Awareness and conservation programs developed by various agencies would have an avenue to address greenhouse gas reduction programs in all NWT schools. This could lead to a territory-wide, long-term change in personal practices and understanding for the need to reduce greenhouse gases.

Implementation

- ECE provides the curriculum for the education system in the NWT.

Linkages

- Environment and Natural Resources conservation education programs in schools
- AEA

Fort Providence Ehdah/GNWT

Action #35 Energy Efficiency Standards

Description

Natural Resources Canada is currently working with provinces and territories to update the 1997 Model National Energy Codes (MNEC). PWS is participating in these discussions which also address how MNEC can be better applied in the future.

Federal programs such as EnerGuide for Houses use MNEC as a reference point.

Outcome

- Updated MNEC will provide reference points for energy performance standards that are appropriate for different climate regions in Canada.

Greenhouse Gas Reduction Potential

- With the NWT's harsh climate and high costs of heating oil, space heating is a significant portion of NWT emissions and fuel expenditures.

Implementation

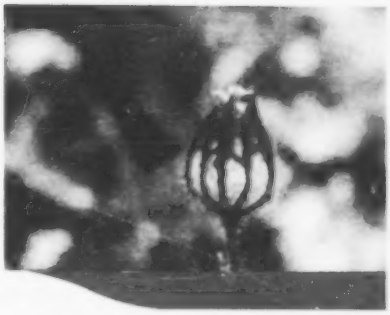
- PWS will review building codes and regulations in an effort to coordinate a simple and effective system of energy efficiency for new buildings.

Linkages

The review of energy efficiency standards is directly linked to:

- EGH
- MNEC for Buildings
- NWT Good Building Practice for Northern Facilities
- Municipal building codes

Action #36 Northern Research into Energy Technologies



Description

ARI in Inuvik and AEA in Yellowknife are actively involved in energy technology research. Specialists within these institutions focus exclusively on northern applications of various energy technologies and report on their efficiency and reliability as potential energy sources for the NWT.

ARI has installed photovoltaic panels, a small wind turbine and a fuel cell at its Inuvik facility. ARI is leading the wind monitoring program in Beaufort communities.

Outcome

- Northern experience to assess new technologies as they become available.
- Technologies being investigated include wind, solar photovoltaics, solar hot water, wood pellet heat, combined heat and power microturbines, solar walls, fuel cells and ground source heat pumps.

Greenhouse Gas Reduction Potential

- Research in energy technologies itself does not directly reduce emissions, however, successfully developed technologies realized from these research programs hold potential for reduction of emissions.

Implementation

- Continued funding of these agencies/institutions insures that relevant and useful energy research continues in the NWT.

Linkages

- ARI and AEA are the main institutions investigating new technologies.
- ENR and ITI provide funding for many new technology applications.

ARCTIC ENERGY ALLIANCE

Action #37 Support for Arctic Energy Alliance

Description

AEA is a not-for-profit society established in 1997 to assist communities, the territorial government, business and consumers to work together to reduce the costs and the environmental impact of energy use and utility services in the NWT. The AEA has become the NWT's best source of information and expertise to manage energy costs and impacts. They also promote renewable energy use and increased energy efficiency and conservation.

AEA is a clearinghouse for information and government programs to the general public of the NWT. Programs address energy efficiency in residential and commercial buildings. Community energy planning is a growing focus, in association with MACA. Staff also encourage and help implement energy innovation and renewable energies in the NWT.

Outcome

- EGH program
- Commercial Energy Audits
- CEP
- Energy Innovation
- AEA is a visible and effective partner and support agency for many of the programs currently being delivered in the NWT.
- AEA will increase their community presence with regard to programs such as EGH by 30% in 2007/2008.

Greenhouse Gas Reduction Potential

- AEA activities result in broad reductions when clients implement advice.

Implementation

AEA is governed by a Board of Directors comprised of one representative from each of the member organizations. The core members are:

- GNWT MACA
- NWT Association of Communities (NWTAC)
- NWT Housing Corporation (NWTHC)
- NWT Public Utilities Board (PUB)
- GNWT Environment and Natural Resources (ENR)
- GNWT Public Works and Services (PWS)

Linkages

- AEA runs numerous programs which encourage energy efficiency and renewable energy, including EGH, Commercial Energy Efficiency Program and CEP.
- AEA also supports programs and technologies such as energy efficiency education, anti-idling programs, solar hot water technologies, solar PV technologies, ground source heat pump technologies, as well as providing general energy efficiency support and information to the general public and government departments.

Action #38 Greenhouse Gas Inventories

Description

The 2006 Greenhouse Gas Inventory will be compiled when the data becomes available early in 2007. This inventory will build on earlier inventories of emissions for 1996 and 2001. These inventories follow international guidelines for reporting established by the Intergovernmental Panel on Climate Change (IPCC).

Inventories provide a baseline to compare NWT's changing emissions. This information informs the Greenhouse Gas Strategy and government energy planning and usage in general.

Outcome

- 2006 Greenhouse Gas Inventory

Greenhouse Gas Reduction Potential

- The Greenhouse Gas Emission Inventory tracks emissions from all sectors of the NWT economy.

Implementation

- ENR prepares the inventories.

Linkages

- Utility Tracking System

Action #39 Climate Change Network

Description

In 2007, ENR will create a Climate Change Network. This Network will provide improved communications and coordination, improved monitoring and tracking and will support efforts to address adaptation to climate change impacts in the NWT.

With the completion of the NWT Greenhouse Gas Strategy, the work on an impact and adaptation plan will commence. Consultation with impacted groups and communities will guide development of the new plan.

Outcome

- Ongoing coordination, information sharing and reporting of greenhouse gas actions in the NWT.
- Greenhouse Gas Inventory
- Impacts and Adaptation Plan

Greenhouse Gas Reduction Potential

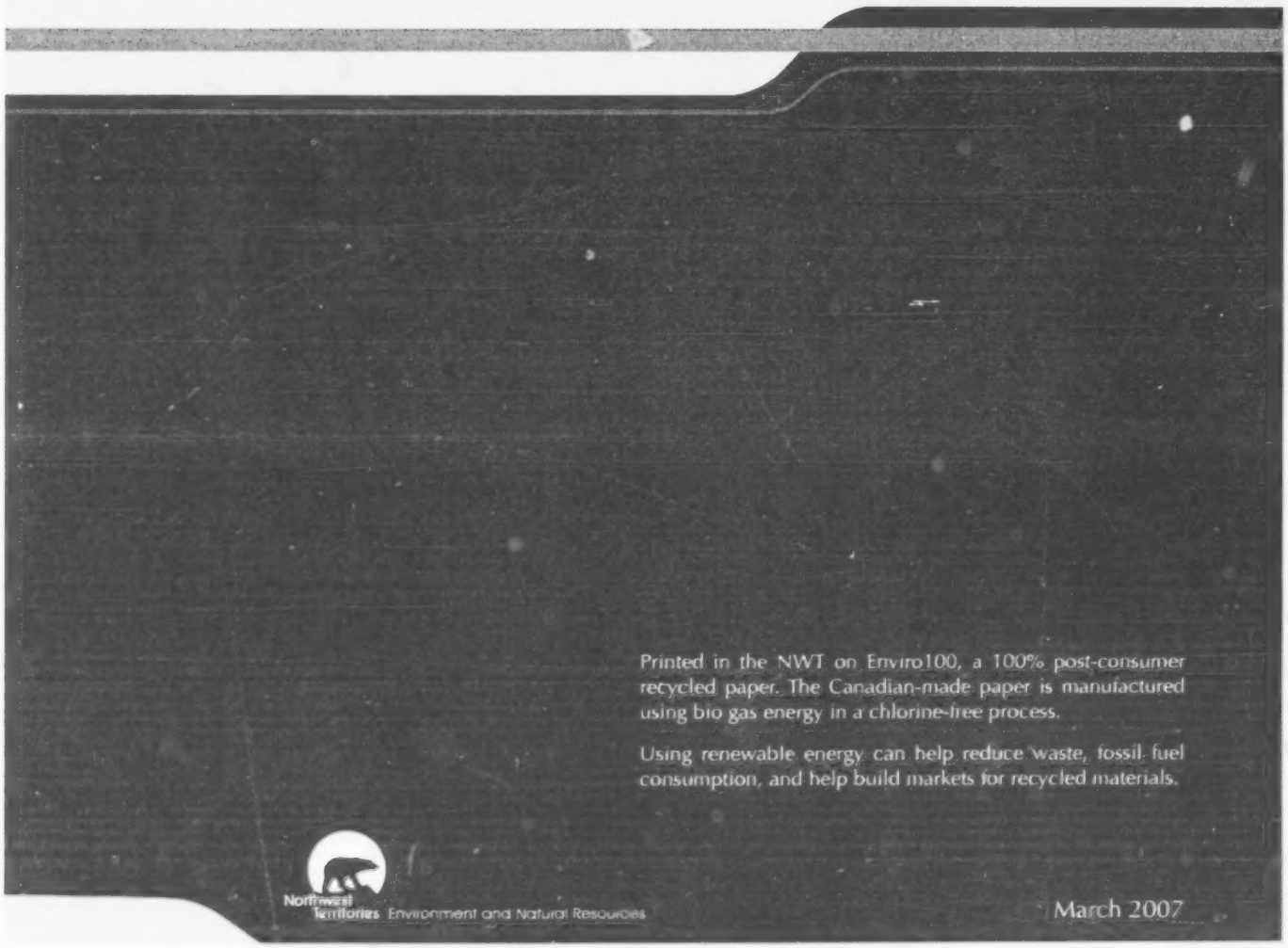
- The Climate Change Network will coordinate implementation of activities in the NWT Greenhouse Gas Strategy.

Implementation

- ENR will create the Climate Change Network.

Linkages

- Greenhouse Gas Strategy
- Climate Change Impacts and Adaptation Plan



Printed in the NWT on Enviro100, a 100% post-consumer recycled paper. The Canadian-made paper is manufactured using bio gas energy in a chlorine-free process.

Using renewable energy can help reduce waste, fossil fuel consumption, and help build markets for recycled materials.

Northwest Territories Environment and Natural Resources

March 2007